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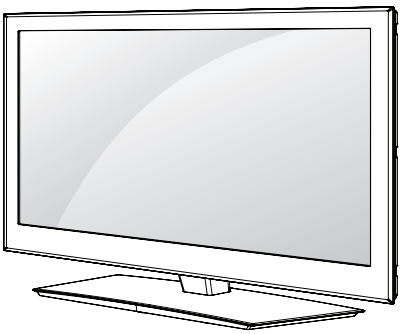
LED LCD TV
SERVICE MANUAL

CHASSIS : LD01U

MODEL: 42LW4500/451C 42LW4500/451C-ZB
42LW450A/N/U 42LW450A/N/U-ZB

CAUTION
BEFORE SERVICING THE CHASSIS,
READ THE SAFETY PRECAUTIONS IN THIS MANUAL.



P/NO : MFL62863071 (1109-REV01)

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SAFETY PRECAUTIONS

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and Exploded View.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent Shock, Fire, or other Hazards.
Do not modify the original design without permission of manufacturer.

General Guidance

An **isolation Transformer should always be used** during the servicing of a receiver whose chassis is not isolated from the AC power line. Use a transformer of adequate power rating as this protects the technician from accidents resulting in personal injury from electrical shocks.

It will also protect the receiver and it's components from being damaged by accidental shorts of the circuitry that may be inadvertently introduced during the service operation.

If any fuse (or Fusible Resistor) in this TV receiver is blown, replace it with the specified.

When replacing a high wattage resistor (Oxide Metal Film Resistor, over 1 W), keep the resistor 10 mm away from PCB.

Keep wires away from high voltage or high temperature parts.

Before returning the receiver to the customer,

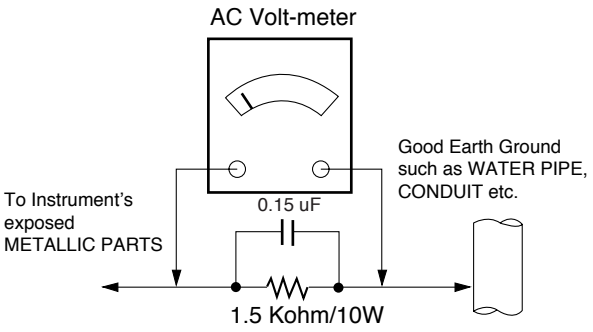
always perform an **AC leakage current check** on the exposed metallic parts of the cabinet, such as antennas, terminals, etc., to be sure the set is safe to operate without damage of electrical shock.

Leakage Current Cold Check(Antenna Cold Check)
With the instrument AC plug removed from AC source, connect an electrical jumper across the two AC plug prongs. Place the AC switch in the on position, connect one lead of ohm-meter to the AC plug prongs tied together and touch other ohm-meter lead in turn to each exposed metallic parts such as antenna terminals, phone jacks, etc.
If the exposed metallic part has a return path to the chassis, the measured resistance should be between 1 MΩ and 5.2 MΩ.
When the exposed metal has no return path to the chassis the reading must be infinite.
An other abnormality exists that must be corrected before the receiver is returned to the customer.

Leakage Current Hot Check (See below Figure)
Plug the AC cord directly into the AC outlet.

Do not use a line Isolation Transformer during this check.
Connect 1.5 K / 10 watt resistor in parallel with a 0.15 uF capacitor between a known good earth ground (Water Pipe, Conduit, etc.) and the exposed metallic parts.
Measure the AC voltage across the resistor using AC voltmeter with 1000 ohms/volt or more sensitivity.
Reverse plug the AC cord into the AC outlet and repeat AC voltage measurements for each exposed metallic part. Any voltage measured must not exceed 0.75 volt RMS which is corresponds to 0.5 mA.
In case any measurement is out of the limits specified, there is possibility of shock hazard and the set must be checked and repaired before it is returned to the customer.

Leakage Current Hot Check circuit



When 25A is impressed between Earth and 2nd Ground for 1 second, Resistance must be less than 0.1 Ω
*Base on Adjustment standard

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SERVICING PRECAUTIONS

CAUTION: Before servicing receivers covered by this service manual and its supplements and addenda, read and follow the *SAFETY PRECAUTIONS* on page 3 of this publication.
NOTE: If unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions on page 3 of this publication, always follow the safety precautions. Remember: Safety First.

General Servicing Precautions

1. Always unplug the receiver AC power cord from the AC power source before;
   a. Removing or reinstalling any component, circuit board module or any other receiver assembly.
   b. Disconnecting or reconnecting any receiver electrical plug or other electrical connection.
   c. Connecting a test substitute in parallel with an electrolytic capacitor in the receiver.
   CAUTION: A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.

2. Test high voltage only by measuring it with an appropriate high voltage meter or other voltage measuring device (DVM, FETVOM, etc) equipped with a suitable high voltage probe.
   Do not test high voltage by "drawing an arc".
3. Do not spray chemicals on or near this receiver or any of its assemblies.
4. Unless specified otherwise in this service manual, clean electrical contacts only by applying the following mixture to the contacts with a pipe cleaner, cotton-tipped stick or comparable non-abrasive applicator; 10 % (by volume) Acetone and 90 % (by volume) isopropyl alcohol (90 % - 99 % strength)
   CAUTION: This is a flammable mixture.
   Unless specified otherwise in this service manual, lubrication of contacts in not required.
5. Do not defeat any plug/socket B+ voltage interlocks with which receivers covered by this service manual might be equipped.
6. Do not apply AC power to this instrument and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
7. Always connect the test receiver ground lead to the receiver chassis ground before connecting the test receiver positive lead.
   Always remove the test receiver ground lead last.
8. *Use with this receiver only the test fixtures specified in this service manual.*
   CAUTION: Do not connect the test fixture ground strap to any heat sink in this receiver.

Electrostatically Sensitive (ES) Devices

Some semiconductor (solid-state) devices can be damaged easily by static electricity. Such components commonly are called *Electrostatically Sensitive (ES) Devices.* Examples of typical ES devices are integrated circuits and some field-effect transistors and semiconductor "chip" components. The following techniques should be used to help reduce the incidence of component damage caused by static by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed to prevent potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a grounded-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static type solder removal device. Some solder removal devices not classified as "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charges sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil or comparable conductive material).
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.
   CAUTION: Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.
8. Minimize bodily motions when handling unpackaged replacement ES devices. (Otherwise harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

General Soldering Guidelines

1. Use a grounded-tip, low-wattage soldering iron and appropriate tip size and shape that will maintain tip temperature within the range or 500 °F to 600 °F.
2. Use an appropriate gauge of RMA resin-core solder composed of 60 parts tin/40 parts lead.
3. Keep the soldering iron tip clean and well tinned.
4. Thoroughly clean the surfaces to be soldered. Use a mall wire-bristle (0.5 inch, or 1.25 cm) brush with a metal handle.
   Do not use freon-propelled spray-on cleaners.
5. Use the following unsoldering technique
   a. Allow the soldering iron tip to reach normal temperature. (500 °F to 600 °F)
   b. Heat the component lead until the solder melts.
   c. Quickly draw the melted solder with an anti-static, suction-type solder removal device or with solder braid.
   CAUTION: Work quickly to avoid overheating the circuit board printed foil.
6. Use the following soldering technique.
   a. Allow the soldering iron tip to reach a normal temperature (500 °F to 600 °F)
   b. First, hold the soldering iron tip and solder the strand against the component lead until the solder melts.
   c. Quickly move the soldering iron tip to the junction of the component lead and the printed circuit foil, and hold it there only until the solder flows onto and around both the component lead and the foil.
   CAUTION: Work quickly to avoid overheating the circuit board printed foil.
   d. Closely inspect the solder area and remove any excess or splashed solder with a small wire-bristle brush.

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IC Remove/Replacement

Some chassis circuit boards have slotted holes (oblong) through which the IC leads are inserted and then bent flat against the circuit foil. When holes are the slotted type, the following technique should be used to remove and replace the IC. When working with boards using the familiar round hole, use the standard technique as outlined in paragraphs 5 and 6 above.

Removal

1. Desolder and straighten each IC lead in one operation by gently prying up on the lead with the soldering iron tip as the solder melts.
2. Draw away the melted solder with an anti-static suction-type solder removal device (or with solder braid) before removing the IC.

Replacement

1. Carefully insert the replacement IC in the circuit board.
2. Carefully bend each IC lead against the circuit foil pad and solder it.
3. Clean the soldered areas with a small wire-bristle brush. (It is not necessary to reapply acrylic coating to the areas).

"Small-Signal" Discrete Transistor Removal/Replacement

1. Remove the defective transistor by clipping its leads as close as possible to the component body.
2. Bend into a "U" shape the end of each of three leads remaining on the circuit board.
3. Bend into a "U" shape the replacement transistor leads.
4. Connect the replacement transistor leads to the corresponding leads extending from the circuit board and crimp the "U" with long nose pliers to insure metal to metal contact then solder each connection.

Power Output, Transistor Device Removal/Replacement

1. Heat and remove all solder from around the transistor leads.
2. Remove the heat sink mounting screw (if so equipped).
3. Carefully remove the transistor from the heat sink of the circuit board.
4. Insert new transistor in the circuit board.
5. Solder each transistor lead, and clip off excess lead.
6. Replace heat sink.

Diode Removal/Replacement

1. Remove defective diode by clipping its leads as close as possible to diode body.
2. Bend the two remaining leads perpendicular y to the circuit board.
3. Observing diode polarity, wrap each lead of the new diode around the corresponding lead on the circuit board.
4. Securely crimp each connection and solder it.
5. Inspect (on the circuit board copper side) the solder joints of the two "original" leads. If they are not shiny, reheat them and if necessary, apply additional solder.

Fuse and Conventional Resistor

Removal/Replacement

1. Clip each fuse or resistor lead at top of the circuit board hollow stake.
2. Securely crimp the leads of replacement component around notch at stake top.
3. Solder the connections.
   CAUTION: Maintain original spacing between the replaced component and adjacent components and the circuit board to prevent excessive component temperatures.

Circuit Board Foil Repair

Excessive heat applied to the copper foil of any printed circuit board will weaken the adhesive that bonds the foil to the circuit board causing the foil to separate from or "lift-off" the board. The following guidelines and procedures should be followed whenever this condition is encountered.

At IC Connections

To repair a defective copper pattern at IC connections use the following procedure to install a jumper wire on the copper pattern side of the circuit board. (Use this technique only on IC connections).

1. Carefully remove the damaged copper pattern with a sharp knife. (Remove only as much copper as absolutely necessary).
2. carefully scratch away the solder resist and acrylic coating (if used) from the end of the remaining copper pattern.
3. Bend a small "U" in one end of a small gauge jumper wire and carefully crimp it around the IC pin. Solder the IC connection.
4. Route the jumper wire along the path of the out-away copper pattern and let it overlap the previously scraped end of the good copper pattern. Solder the overlapped area and clip off any excess jumper wire.

At Other Connections

Use the following technique to repair the defective copper pattern at connections other than IC Pins. This technique involves the installation of a jumper wire on the component side of the circuit board.

1. Remove the defective copper pattern with a sharp knife. Remove at least 1/4 inch of copper, to ensure that a hazardous condition will not exist if the jumper wire opens.
2. Trace along the copper pattern from both sides of the pattern break and locate the nearest component that is directly connected to the affected copper pattern.
3. Connect insulated 20-gauge jumper wire from the lead of the nearest component on one side of the pattern break to the lead of the nearest component on the other side. Carefully crimp and solder the connections.
   CAUTION: Be sure the insulated jumper wire is dressed so the it does not touch components or sharp edges.

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SPECIFICATION

NOTE : Specifications and others are subject to change without notice for improvement.

1. Application range

This specification is applied to the LCD/ LED LCD TV used LD01U chassis.

2. Requirement for Test

Each part is tested as below without special appointment.

1) Temperature
   : 25 ºC ± 5 ºC (77 ºF ± 9 ºF), CST : 40 ºC ± 5 ºC
2) Relative Humidity : 65 % ± 10 %
3) Power Voltage
   : Standard input voltage (AC 100-240 V~ 50 / 60 Hz)
   * Standard Voltage of each products is marked by models.
4) Specification and performance of each parts are followed each drawing and specification by part number in accordance with BOM.
5) The receiver must be operated for about 5 minutes prior to the adjustment.

3. Test method

1) Performance: LGE TV test method followed
2) Demanded other specification
   - Safety: CE, IEC specification
   - EMC:CE, IEC

4. Model General Specification

No.	Item	Specification	Remarks
1	Market	EU(PAL Market-36Countries)	**DTV-T/C & Analog** (Germany, Netherlands, Switzerland, Hungary, Austria, Slovenia, Sweden, Denmark, Finland, Norway, Bulgaria
			DTV-T & Analog UK, France, Spain, Italy, Belgium, Russia, Luxemburg, Greece, Czech, Croatia,Turkey, Morocco, Ireland, Latvia, Estonia, Lithuania, Poland, Portugal, Romania, Ukraine
			Analog Only Kazakhstan, Albania, Bosnia, Serbia, Slovakia
2	Broadcasting system	1) PAL-BG 2) PAL-DK 3) PAL-I/I' 4) SECAM L/L' 5) DVB-T/C/S (ID TV)	
3	Receiving system	Analog : Upper Heterodyne Digital : COFDM, QAM	
4	Scart Jack (1EA)	PAL, SECAM	Scart Jack is Full scart and support RF-OUT(analog & DTV)
5	Video Input RCA(1EA)	PAL, SECAM, NTSC	4System : PAL, SECAM, NTSC, PAL60
6	Component Input(1EA)	Y/Cb/Cr, Y/Pb/Pr	
7	RGB Input	RGB-PC	Analog(D-SUB 15PIN)
8	HDMI Input (3EA)	HDMI1-DTV (DVI) HDMI2-DTV HDMI3-DTV	PC(HDMI version 1.3) Support HDCP
9	Audio Input (3EA)	RGB/DVI Audio, Component, AV	L/R Input
10	SDPIF out (1EA)	SPDIF out	
11	Earphone out (1EA)	Antenna, AV1, AV2, AV3, Component, RGB, HDMI1, HDMI2, HDMI3, HDMI4	
12	USB (1EA)	For Service (download)	
		DivX	
13	DVB	DVB-T	CI : UK, Finland, Denmark, Norway, Sweden, Russia, Spain, Ireland, Luxemburg, Belgium, Netherland CI+ : France(Canal+), Italy(DGTVi)
		DVB-C	CI : Switzerland, Austria, Slovenia, Hungary, Bulgaria CI+ : Switzerland(UPC,Cablecom), Netherland(Ziggo), Germany(KDG,CWB), Finland(labwise)
		DVB-S	CI+ : Germany(Astra HD+)

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5. Component Video Input (Y, C_B/P_B, C_R/P_R)

No.	Specification				Remark
	Resolution	H-freq(kHz)	V-freq(Hz)		
1.	720x480	15.73	60.00	SDTV,DVD 480i	
2.	720x480	15.63	59.94	SDTV,DVD 480i	
3.	720x480	31.47	59.94	480p	
4.	720x480	31.50	60.00	480p	
5.	720x576	15.625	50.00	SDTV,DVD 625 Line	
6.	720x576	31.25	50.00	HDTV 576p	
7.	1280x720	45.00	50.00	HDTV 720p	
8.	1280x720	44.96	59.94	HDTV 720p	
9.	1280x720	45.00	60.00	HDTV 720p	
10.	1920x1080	31.25	50.00	HDTV 1080i	
11.	1920x1080	33.75	60.00	HDTV 1080i	
12.	1920x1080	33.72	59.94	HDTV 1080i	
13.	1920x1080	56.250	50	HDTV 1080p	
14.	1920x1080	67.5	60	HDTV 1080p	

6. RGB (PC)

No.	Specification				Proposed	Remark
	Resolution	H-freq(kHz)	V-freq(Hz)	Pixel Clock(MHz)		
1.	720*400	31.468	70.08	28.321		For only DOS mode
2.	640*480	31.469	59.94	25.17	VESA	Input 848*480 60 Hz, 852*480 60 Hz -> 640*480 60 Hz Display
3.	800*600	37.879	60.31	40.00	VESA	
4.	1024*768	48.363	60.00	65.00	VESA(XGA)	
5.	1280*768	47.78	59.87	79.5	WXGA	
6.	1360*768	47.72	59.8	84.75	WXGA	FHD Model
7.	1366*768	47.56	59.6	84.75	WXGA	WXGA Model
8.	1200*1024	63.901	60.02	100.075	SXGA	FHD model
9.	1280*720	45	60	74.25	720p	DTV Standard
10.	1920*1080	67.5	60	148.5	WUXGA	FHD model

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7. HDMI Input

7.1. DTV Mode

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	Remark
1.	720*480	31.469/31.5	59.94/60	27.00/27.03	SDTV 480P	
2.	720*576	31.25	50	54	SDTV 576P	
3.	1280*720	37.500	50	74.25	HDTV 720P	
4.	1280*720	44.96/45	59.94/60	74.17/74.25	HDTV 720P	
5.	1920*1080	33.72/33.75	59.94/60	74.17/74.25	HDTV 1080I	
6.	1920*1080	28.125	50.00	74.25	HDTV 1080I	
7.	1920*1080	26.97/27	23.97/24	74.17/74.25	HDTV 1080P	
8.	1920*1080	33.716/33.75	29.976 /30.00	74.25	HDTV 1080P	
9.	1920*1080	56.250	50	148.5	HDTV 1080P	
10.	1920*1080	67.43/67.5	59.94/60	148.35/148.50	HDTV 1080P	

7.2. PC Mode

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	Remark
1.	720*400	31.468	70.08	28.321		HDCP
2.	640*480	31.469	59.94	25.17	VESA	HDCP
3.	800*600	37.879	60.31	40.00	VESA	HDCP
4.	1024*768	48.363	60.00	65.00	VESA(XGA)	HDCP
5.	1280*768	47.78	59.87	79.5	WXGA	HDCP
6.	1360*768	47.72	59.8	84.75	WXGA	HDCP
7.	1280*720	45	60	74.25		HDCP
8.	1280*1024	63.981	60.02	108.875	SXGA	HDCP/FHD model
9.	1920*1080	67.5	60	148.5	WUXGA	HDCP/FHD model

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8. 3D Specification

8.1. HDMI Input

(1) HDMI Input(1.4a)

When connect the cable on TV or change the input mode, Automatically 3D on.
Display OSD information -> 1920x2205[1080p 24], 1280x1470[720p 50/60]

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1920*2205	53.95 / 54	23.98 / 24	148.35/148.5	HDTV 1080P	Frame packing (1080 24p)
2	1280*1470	89.9 / 90	59.94/60	148.35/148.5	HDTV 720P	Frame packing (720 60p)
3	1280*1470	75	50	148.5	HDTV 720P	Frame packing (720 50p)
4	1920*1080	67.5	60	148.5	HDTV 1080P	Side by Side(half), Top and bottom
5	1920*1080	56.3	50	148.5	HDTV 1080P	Side by Side(half), Top and bottom,
6	1280*720	45	60	74.25	HDTV 720P	Side by Side(half), Top and Bottom
7	1280*720	37.5	50	74.25	HDTV 720P	Side by Side(half), Top and Bottom
8	1920*1080	33.7	60	74.25	HDTV 1080i	Side by Side(half), Top and Bottom
9	1920*1080	28.1	50	74.25	HDTV 1080i	Side by Side(half), Top and Bottom
10	1920*1080	27	24	74.25	HDTV 1080P	Side by Side(half), Top and Bottom
11	1920*1080	33.7	30	89.1	HDTV 1080P	Side by Side(half), Top and Bottom

(2) HDMI Input (1.3)

1) Connect the HDMI cable & receiving the HDMI signal.
2) Press “3D” key of remote control & select 3D format below.

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	Proposed	3D input proposed mode
1	1280*720	45.00	60.00	74.25	HDTV 720P	Side by Side, Top & Bottom
2	1280*720	37.500	50	74.25	HDTV 720P	Side by Side, Top & Bottom
3	1920*1080	33.75	60.00	74.25	HDTV 1080I	Side by Side, Top & Bottom
4	1920*1080	28.125	50.00	74.25	HDTV 1080I	Side by Side, Top & Bottom
5	1920*1080	27.00	24.00	74.25	HDTV 1080P	Side by Side, Top & Bottom, Checkerboard
6	1920*1080	33.75	30.00	74.25	HDTV 1080P	Side by Side, Top & Bottom, Checkerboard
7	1920*1080	67.50	60.00	148.5	HDTV 1080P	Side by Side, Top & Bottom, Checkerboard Single Frame Sequential
8	1920*1080	56.250	50	148.5	HDTV 1080P	Side by Side, Top & Bottom, Checkerboard Single Frame Sequential

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8.2. USB Input

(1) USB Divx

: When selecting MPO file, Automatically 3D on.

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1920*1080	33.75	30.000	74.25	Side by Side Top & Bottom Checkerboard	HDTV 1080P

(2) MPO Piture 3D

: When selecting MPO file, Automatically 3D on.

(3) Store 3D Demo motion

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	1920*1080	33.75	30.000	74.25	Side by Side	HDTV 1080P

8.3. DTV Input

: When watching the DTV mode, Press “3D” key & select 3D format.

No.	Resolution	H-freq(kHz)	V-freq.(Hz)	Pixel clock(MHz)	3D input proposed mode	Proposed
1	720x579 (interlace)		50.000		Side by Side Top & Bottom	SD 576i 50 Hz
2	1920x1080 (interlace)		50.000		Side by Side Top & Bottom	HD 1080i 50 Hz

8.4. 2D to 3D

: Support all input mode which is possible.(refer to 3D specification)

8.5. Reference

2D to 3D Top & Bottom Side By Side Checkerboard Frame Seq

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ADJUSTMENT INSTRUCTION

1. Application Range

This specification sheet is applied to all of the LCD/ LED LCD TV with LD01U chassis.

2. Designation

1) The adjustment is according to the order which is designated and which must be followed, according to the plan which can be changed only on agreeing.
2) Power Adjustment: Free Voltage
3) Magnetic Field Condition: Nil.
4) Input signal Unit: Product Specification Standard
5) Reserve after operation: Above 5 Minutes (Heat Run)
   Temperature : at 25 ºC ± 5 ºC
   Relative humidity : 65 % ± 10 %
   Input voltage : 220 V, 60 Hz
6) Adjustment equipments: Color Analyzer(CA-210 or CA-110), DDC Adjustment Jig equipment, Service remote control.
7) Push The “IN STOP” key - For memory initialization.

Case1 : Software version up
1. After downloading S/W by USB, TV set will reboot automatically.
2. Push “In-stop” key.
3. Push “Power on” key.
4. Function inspection
5. After function inspection, Push “In-stop” key.

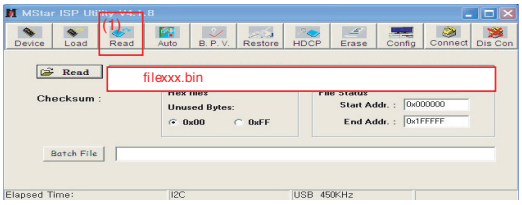
Case2 : Function check at the assembly line
1. When TV set is entering on the assembly line, Push “In-stop” key at first.
2. Push “Power on” key for turning it on.
   -> If you push “Power on” key, TV set will recover channel information by itself.
3. After function inspection, Push “In-stop” key.

3. Main PCB check process

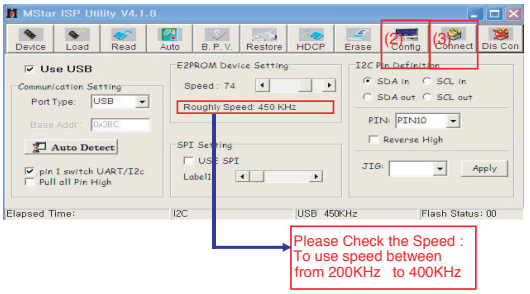
* APC - After Manual-Insult, executing APC

* Boot file Download

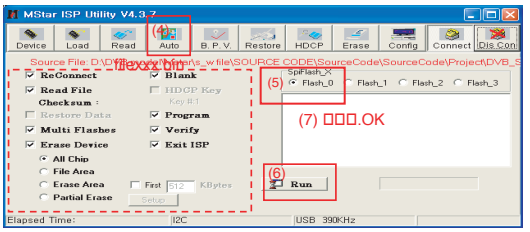
1) Execute ISP program “Mstar ISP Utility” and then click “Config” tab.



2) Set as below, and then click “Auto Detect” and check “OK” message. If “Error” is displayed, check connection between computer, jig, and set.
3) Click “Read” tab, and then load download file(XXXX.bin) by clicking “Read”.
4) Click “Connect” tab. If “Can’t” is displayed, check connection between computer, jig, and set.

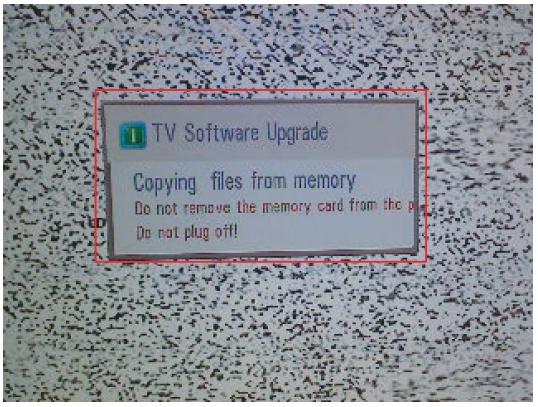


5) Click “Auto” tab and set as below.
6) Click “Run”.
7) After downloading, check “OK” message.



* USB DOWNLOAD

1) Put the USB Stick to the USB socket.
2) Automatically detecting update file in USB Stick.
   - If your downloaded program version in USB Stick is Low, it didn’t work. But your downloaded version is High, USB data is automatically detecting.
3) Show the message “Copying files from memory”.



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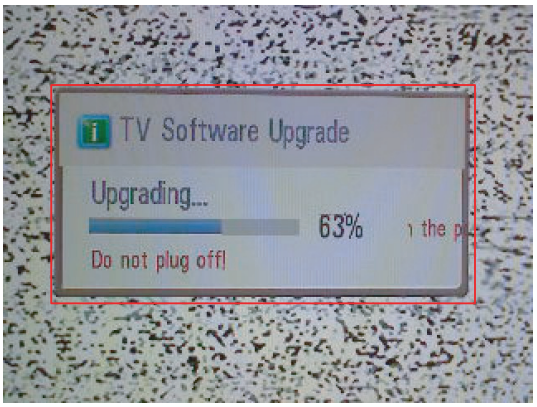
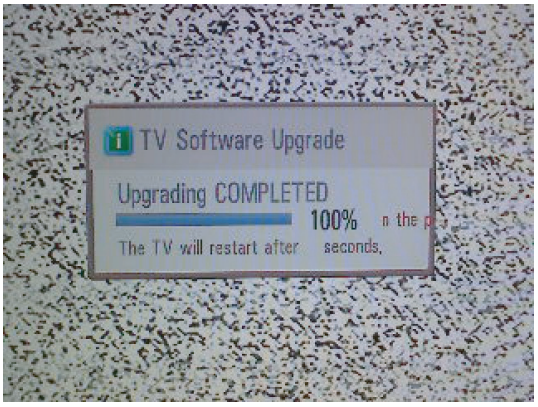
4) Updating is starting.





5) Uploading completed, The TV will restart automatically.
6) If your TV is turned on, check your updated version and Tool option.(explain the Tool option, next stage)
   * If downloading version is more high than your TV have, TV can lost all channel data. In this case, you have to channel recover. if all channel data is cleared, you didn't have a DTV/ATV test on production line.

*** After downloading, have to adjust Tool Option again.**

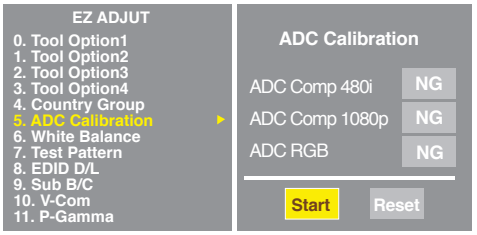
1) Push "IN-START" key in service remote control.
2) Select "Tool Option 1" and push "OK" key.
3) Punch in the number. (Each model has their number)

Module	Tool option1	Tool option2	Tool option3	Tool option4	Tool option5
LGD	26528	18986	55337	27032	8448

4) Completed selecting Tool option.

3.1. ADC Process

(1) ADC
- Enter Service Mode by pushing "ADJ" key,
- Enter Internal ADC mode by pushing "▶" key at "5. ADC Calibration"



<Caution> Using 'power on' key of the Adjustment remote control, power on TV.

* ADC Calibration Protocol (RS232)

Adjust Sequence

Item	CMD1	CMD2	Data0		
Adjust 'Mode In'	A	A	0	0	When transfer the 'Mode In', Carry the command.
ADC Adjust	A	D	1	0	Automatically adjustment (The use of a internal pattern)

- aa 00 00 [Enter Adjust Mode]
- xb 00 40 [Component1 Input (480i)]
- ad 00 10 [Adjust 480i Comp1]
- xb 00 60 [RGB Input (1024*768)]
- ad 00 10 [Adjust 1024*768 RGB]
- aa 00 90 End Adjust mode

* Required equipment : Adjustment remote control.

3.2. Function Check

* Check display and sound
- Check Input and Signal items. (cf. work instructions)
  1) TV
  2) AV (SCART1/SCART2/CVBS)
  3) COMPONENT (480i)
  4) RGB (PC : 1024 x 768 @ 60 Hz)
  5) HDMI
  6) PC Audio In

  * Display and Sound check is executed by Remote control.

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4. Total Assembly line process

4.1. Adjustment Preparation

· W/B Equipment condition
CA210
: CCFL/EEFL -> CH9, Test signal: Inner pattern(80IRE)
LED -> CH14, Test signal: Inner pattern(80IRE)

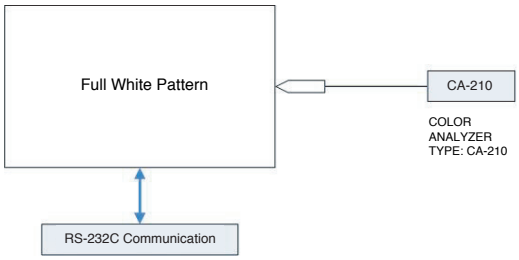
· Above 5 minutes H/run in the inner pattern. (“power on” key of adjust remote control)

Cool	13,000	K	X=0.269(±0.002)	
			Y=0.273(±0.002)	<Test Signal>
Medium	9,300	K	X=0.285(±0.002)	Inner pattern
			Y=0.293(±0.002)	(204 gray, 80 IRE)
Warm	6,500	K	X=0.313(±0.002)	
			Y=0.329(±0.002)	

· Edge LED W/B Table is process of time (Only LGD Module)
CA210: CH14, Test signal : Inner pattern(80IRE)

GP2R	Aging Time (Min.)	Cool		Medium		Warm	
		X	Y	X	Y	X	Y
		269	273	285	293	313	329
1	0-2	279	288	295	308	319	338
2	3-5	278	286	294	306	318	336
3	6-9	277	285	293	305	317	335
4	10-19	276	283	292	303	316	333
5	20-35	274	280	290	300	314	330
6	36-49	272	277	288	297	312	327
7	50-79	271	275	287	295	311	325
8	80-149	270	274	286	294	310	324
9	Over 150	269	273	285	293	309	323

* Connecting picture of the measuring instrument
(On Automatic control)
Inside PATTERN is used when W/B is controlled. Connect to auto controller or push Adjustment remote control P-ONLY-> Enter the mode of White-Balance, the pattern will come out.



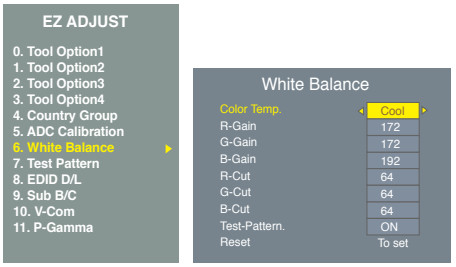
* Auto-control interface and directions
1) Adjust in the place where the influx of light like floodlight around is blocked. (illumination is less than 10 lux).
2) Adhere closely the Color Analyzer (CA210) to the module less than 10 cm distance, keep it with the surface of the Module and Color Analyzer’s prove vertically.(80° ~ 100°).
3) Aging time
- After aging start, keep the power on (no suspension of power supply) and heat-run over 5 minutes.
- Using ‘no signal’ or ‘full white pattern’ or the others, check the back light on.

• Auto adjustment Map(RS-232C)
RS-232C COMMAND
[CMD ID DATA]
Wb 00 00 White Balance Start
Wb 00 ff White Balance End

	RS-232C COMMAND [CMD ID DATA]			MIN	CENTER (DEFAULT)			MAX
	Cool	Mid	Warm		Cool	Mid	Warm	
R Gain	jg	Ja	jd	00	172	192	192	192
G Gain	jh	Jb	je	00	172	192	192	192
B Gain	ji	Jc	jf	00	192	192	172	192
R Cut					64	64	64	128
G Cut					64	64	64	128
B Cut					64	64	64	128

** Caution **
Color Temperature : COOL, Medium, Warm.
One of R Gain/G Gain/ B Gain should be kept on 0xC0, and adjust other two lower than C0.
(when R/G/B Gain are all C0, it is the FULL Dynamic Range of Module)

* Manual W/B process using adjusts remote control.
• After enter Service Mode by pushing “ADJ” key,
• Enter White Balance by pushing “▶” key at “6. White Balance”.



* After you finished all adjustments, Press “In-start” key and compare Tool option and Area option value with its BOM, if it is correctly same then unplug the AC cable. If it is not same, then correct it same with BOM and unplug AC cable. For correct it to the model’s module from factory Jig model.
* Push the “IN STOP” key after completing the function inspection. And Mechanical Power Switch must be set “ON”.

4.2. DDC EDID Write (RGB 128Byte)

• Connect D-sub Signal Cable to D-sub Jack.
• Write EDID Data to EEPROM(24C02) by using DDC2B protocol.
• Check whether written EDID data is correct or not.
* For Service main Assembly, EDID have to be downloaded to Insert Process in advance.

4.3. DDC EDID Write (HDMI 256Byte)

• Connect HDMI Signal Cable to HDMI Jack.
• Write EDID Data to EEPROM(24C02) by using DDC2B protocol.
• Check whether written EDID data is correct or not.
* For Service main Assembly, EDID have to be downloaded to Insert Process in advance.

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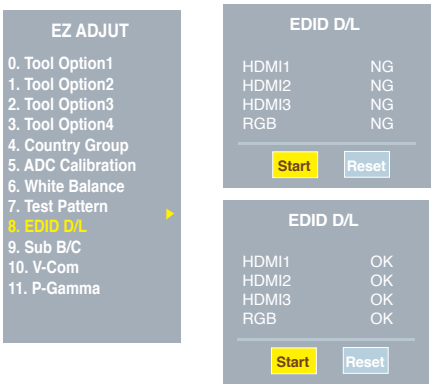
4.4. EDID DATA

1) All Data : HEXA Value
2) Changeable Data :
*: Serial No : Controlled / Data:01
**: Month : Controlled / Data:00
***:Year : Controlled
****:Check sum

- Auto Download

- After enter Service Mode by pushing “ADJ” key,
- Enter EDID D/L mode.
- Enter “START” by pushing “OK” key.



* Caution : Never connect HDMI & D-sub Cable when EDID download

* Edid data and Model option download (RS232)

Item	CMD1	CMD2	Data0		
Download ‘Mode In’	A	A	0	0	When transfer the ‘Mode In’, Carry the command.
Download	A	E	00	10	Automatically Download (The use of a internal pattern)

- Manual Download

* Caution
1) Use the proper signal cable for EDID Download.
- Analog EDID : Pin3 exists
- Digital EDID : Pin3 exists
2) Never connect HDMI & D-sub Cable at the same time.
3) Use the proper cables below for EDID Writing.
4) Download HDMI1, HDMI2, separately because HDMI1 is different from HDMI2.

For Analog EDID	For HDMI EDID
D-sub to D-sub	DVI-D to HDMI or HDMI to HDMI

Item	Condition	Data(Hex)
Manufacturer ID	GSM	1E6D
Version	Digital : 1	01
Revision	Digital : 3	03

1) FHD RGB EDID data

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	a		b			
10	c		01	03	68	10	09	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	81	80	61	40	45	40	31	40	01	01
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	01	1D	00	72	51	D0	1E	20
50	6E	28	55	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	d			
70	d														00	e
80	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
90	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
A0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
B0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
C0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
D0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
E0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
F0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF

2) FHD HDMI EDID data

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
	00	FF	FF	FF	FF	FF	FF	00	1E	6D	a		b			
10	c		01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	71	4F	81	80	01	01	01	01	01	01
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	1B	21	50	A0	51	00	1E	30
50	48	88	35	00	A0	5A	00	00	00	1C	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	d			
70	d														01	e
80	02	03	26	F1	4E	10	1F	84	13	05	14	03	02	12	20	21
90	22	15	01	26	15	07	50	09	57	07	f					
A0	f		E3	05	03	01	01	1D	80	18	71	1C	16	20	58	2C
B0	25	00	A0	5A	00	00	00	9E	01	1D	00	72	51	D0	1E	20
C0	6E	28	55	00	A0	5A	00	00	00	1E	02	3A	80	18	71	38
D0	2D	40	58	2C	45	00	A0	5A	00	00	00	1E	01	1D	00	BC
E0	52	D0	1E	20	B8	28	55	40	A0	5A	00	00	00	1E	00	00
F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	e

3) 3D RGB EDID data

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	a		b			
10	c		01	03	68	10	09	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	81	80	61	40	45	40	31	40	01	01
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	01	1D	00	72	51	D0	1E	20
50	6E	28	55	00	A0	5A	00	00	00	1E	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	d			
70	d														00	e
80	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
90	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
A0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
B0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
C0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
D0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
E0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
F0	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF

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4) 3D HDMI EDID data

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
00	00	FF	FF	FF	FF	FF	FF	00	1E	6D	a		b			
10	c		01	03	80	10	09	78	0A	EE	91	A3	54	4C	99	26
20	0F	50	54	A1	08	00	71	4F	81	80	01	01	01	01	01	01
30	01	01	01	01	01	01	02	3A	80	18	71	38	2D	40	58	2C
40	45	00	A0	5A	00	00	00	1E	1B	21	50	A0	51	00	1E	30
50	48	88	35	00	A0	5A	00	00	00	1C	00	00	00	FD	00	3A
60	3E	1E	53	10	00	0A	20	20	20	20	20	20	d			
70	d														01	e
80	02	03	37	F1	4E	10	1F	84	13	05	14	03	02	12	20	21
90	22	15	01	26	15	07	50	09	57	07	f					
A0	f															
B0	f			E3	05	03	01	01	1D	80	18	71	1C	16	20	58
C0	2C	25	00	A0	5A	00	00	00	9E	01	1D	00	72	51	D0	1E
D0	20	6E	28	55	00	A0	5A	00	00	00	1E	02	3A	80	18	71
E0	38	2D	40	58	2C	45	00	A0	5A	00	00	00	1E	00	00	00
F0	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	e

* Detail EDID Options are below

ⓐ Product ID

Model Name	HEX	EDID Table	DDC Function
FHD Model	0001	01 00	Analog/Digital

ⓑ Serial No: Controlled on production line.

ⓒ Month, Year: Week : '01' -> '01'
Year : '2011' -> '15' fix

ⓓ Model Name(Hex):

MODEL	MODEL NAME(HEX)
all	00 00 00 FC 00 4C 47 20 54 56 0A 20 20 20 20 20 20 20

ⓔ Checksum: Changeable by total EDID data.

EDID C/S data		FHD		HD	
		HDMI	RGB	HDMI	RGB
check sum (Hex)	Block 0	E2	1C		
	Block 1	E1 (HDMI1)			
		D1 (HDMI2)			
		C1 (HDMI3)			

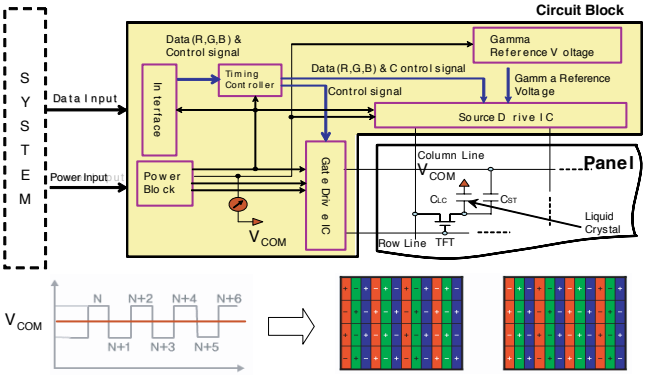
ⓕ Vendor Specific(HDMI)

INPUT	MODEL NAME(HEX)
HDMI1	78030C001000B82D20C00E01400A3C08201820982058203820
HDMI2	78030C002000B82D20C00E01400A3C08201820982058203820
HDMI3	78030C003000B82D20C00E01400A3C08201820982058203820

4.5. V-COM Adjust(Only LGD(M+S) Module)

- Why need Vcom adjustment?

■ The Vcom (Common Voltage) is a Reference Voltage of Liquid Crystal Driving.
-> Liquid Crystal need for Polarity Change with every frame.



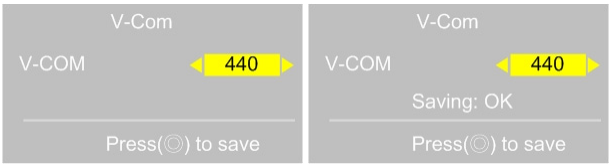
- Adjust sequence

· Press the PIP key of th ADJ remote control.(This PIP key is hot key to enter the VCOM adjusting mode)
(Or After enter Service Mode by pushing "ADJ" key, then Enter V-Com Adjust mode by pushing "▶" key at "10. V-Com".)

· As pushing the right or the left key on the remote control, and find the V-COM value which is no or minimized the Flicker. (If there is no flicker at default value, Press the exit key and finish the VCOM adjustment.)

· Push the "OK" key to store value. Then the message "Saving OK" is pop.

· Press the exit key to finish VCOM adjustment.



(Visual Adjust and control the Voltage level)

4.6. Outgoing condition Configuration

When pressing IN-STOP key by Service remote control, Red LED are blinked alternatively. And then Automatically turn off. (Must not AC power OFF during blinking)

4.7. Hi-pot Test

Confirm whether is normal or not when between power board's ac block and GND is impacted on 1.5 kV(dc) or 2.2 kV(dc) for one second.

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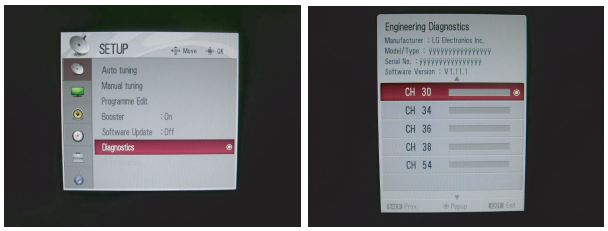
5. Model name & Serial number D/L

- Press “Power on” key of service remote control. (Baud rate : 115200 bps)
- Connect RS232 Signal Cable to RS-232 Jack.
- Write Serial number by use RS-232.
- Must check the serial number at the Diagnostics of SET UP menu. (Refer to below).



5.1. Signal TABLE

CMD	LENGTH	ADH	ADL	DATA_1	. . .	Data_n	CS	DELAY

CMD : A0h
LENGTH : 85~94h (1~16 bytes)
ADH : EEPROM Sub Address high (00~1F)
ADL : EEPROM Sub Address low (00~FF)
Data : Write data
CS : CMD + LENGTH + ADH + ADL + Data_1 +…+ Data_n
Delay : 20ms

5.2. Command Set

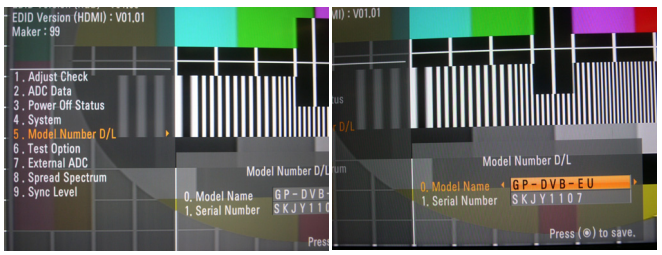
No.	Adjust mode	CMD(hex)	LENGTH(hex)	Description
1	EEPROM WRITE	A0h	84h+n	n-bytes Write(n=1~16)

* Description
FOS Default write : <7mode data> write
Vtotal, V_Frequency, Sync_Polarity, Htotal, Hstart, Vstart, 0, Phase
Data write : Model name and Serial number write in EEPROM.

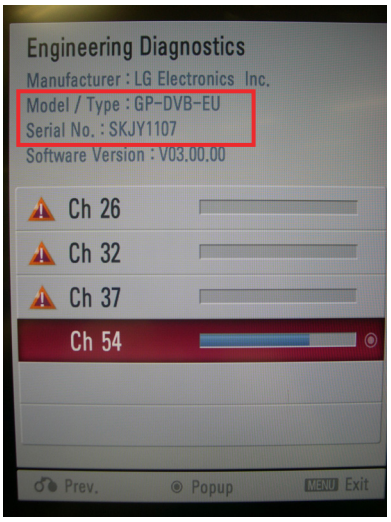
5.3. Method & notice

A. Serial number D/L is using of scan equipment.
B. Setting of scan equipment operated by Manufacturing Technology Group.
C. Serial number D/L must be conformed when it is produced in production line, because serial number D/L is mandatory by D-book 4.0.

* Manual Download (Model Name and Serial Number)
If the TV set is downloaded by OTA or Service man, Sometimes model name or serial number is initialized.(Not always)
There is impossible to download by bar code scan, so It need Manual download.
1) Press the ‘instart’ key of Adjustment remote control.
2) Go to the menu ‘5.Model Number D/L’ like below photo.
3) Input the Factory model name(ex 42LD450-ZA) or Serial number like photo.



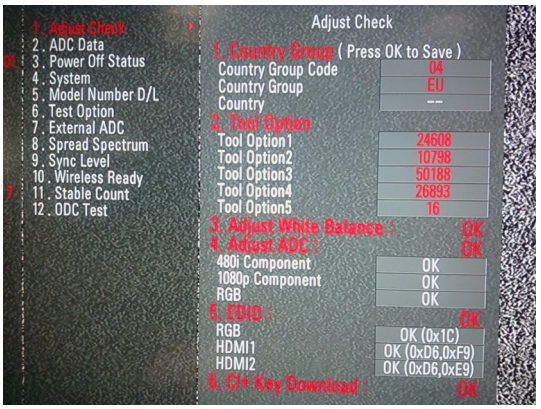
4) Check the model name Instart menu -> Factory name displayed (ex 42LD450-ZA)
5) Check the Diagnostics (DTV country only) -> Buyer model displayed (ex 42LD450)



6. CI+ Key Download method

(1) Download Procedure
1) Press "Power on" key of a service remote control. (Baud rate : 115200 bps)
2) Connect RS232-C Signal Cable.
3) Write CI+ Key through RS-232-C.
4) Check whether the key was downloaded or not at ‘In Start’ menu. (Refer to below).

=> Check the Download to CI+ Key value in LGset.
1. check the method of CI+ Key value
a. check the method on Instart menu



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b. check the method of RS232C Command
1) into the main ass'y mode (RS232 : aa 00 00)

CMD 1	CMD 2	Data 0	
A	A	0	0

2) check the key download for transmitted command (RS232 : ci 00 10)

CMD 1	CMD 2	Data 0	
C	I	1	0

3) result value
- normally status for download : OKx
- abnormally status for download : NGx

2. Check the method of CI+ Key value (RS232)
1) into the main ass'y mode (RS232 : aa 00 00)

CMD 1	CMD 2	Data 0	
A	A	0	0

2) Check the method of CI+ key by command (RS232 : ci 00 20)

CMD 1	CMD 2	Data 0	
C	I	2	0

3) Result value
i 01 OK 1d1852d21c1ed5dcx
→ CI+ key Value

7. Local Dimming Function Check

Step1) Turn on TV.
Step2) Press "P-only" key, entrance to power only mode and Press "Exit" key.
Step3) Press "Tilt" key, entrance to Local Dimming mode.
Step4) At the Local Dimming mode, module Edge Backlight moving right to left Back light of module moving.
Step5) Confirm the Local Dimming mode.
Step6) Press "Exit" key.

8. 3D function test

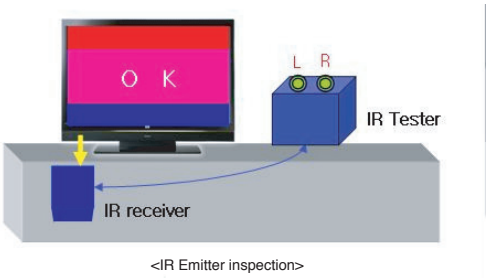
(Pattern Generator MSHG-600, MSPG-6100 [Support HDMI 1.4])
* HDMI mode No. 872, pattern No. 83)
1) Please input 3D test pattern like below.

2) When 3D OSD appear automatically, then select OK key.

3) Don't wear a 3D Glasses, Check the picture like below.

9. IR emitter inspection

(1) Start 3D pattern inspection
(2) If IR emitter emitter signal is correctly received to IR receiver, the lamp of IR tester turn on.



<IR Emitter inspection>

<IR Tester Lamp turned off(NG)> <IR Tester Lamp turned on(OK)>

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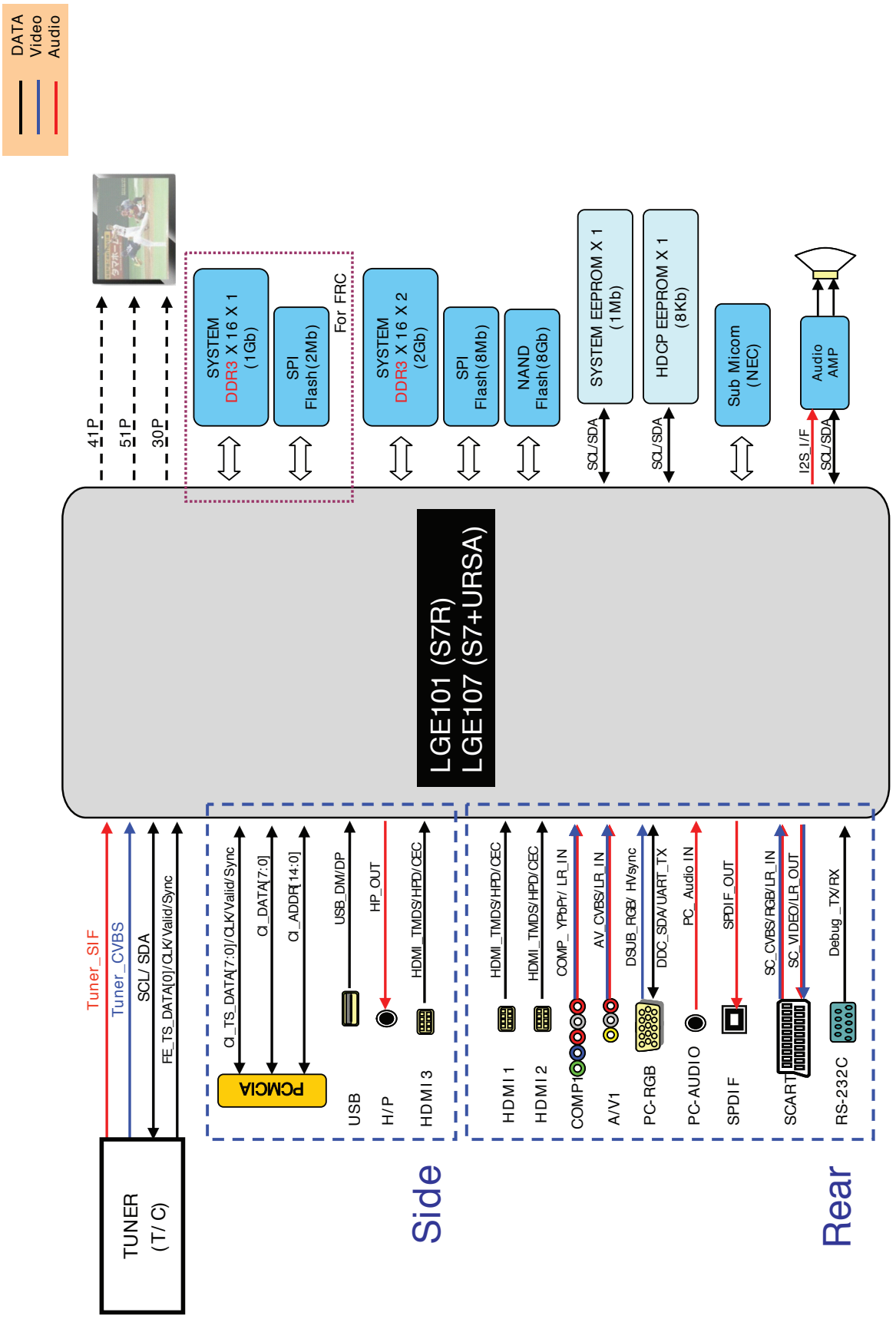
BLOCK DIAGRAM



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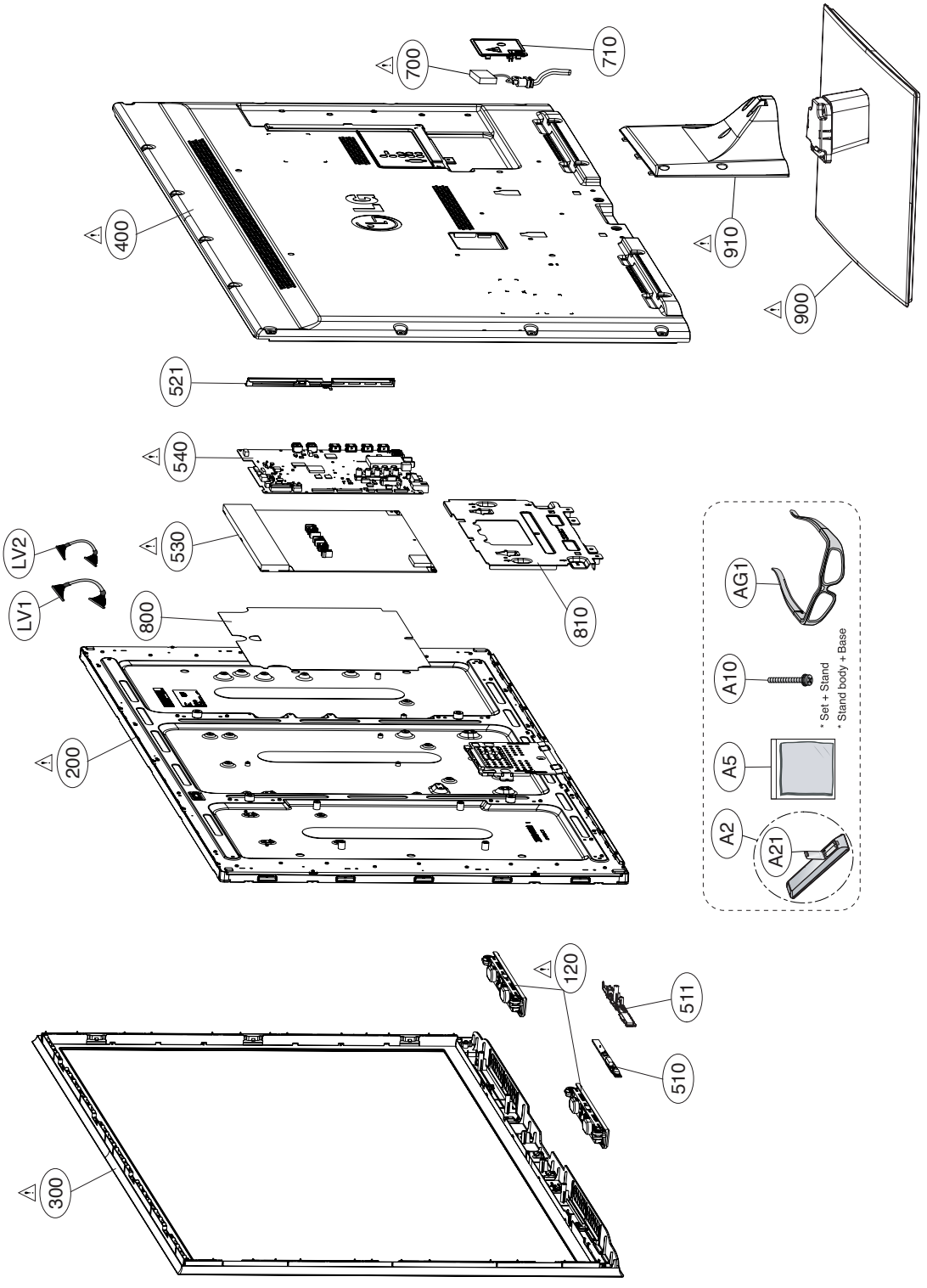
EXPLODED VIEW

IMPORTANT SAFETY NOTICE

Many electrical and mechanical parts in this chassis have special safety-related characteristics. These parts are identified by ⚠ in the Schematic Diagram and EXPLODED VIEW.
It is essential that these special safety parts should be replaced with the same components as recommended in this manual to prevent X-RADIATION, Shock, Fire, or other Hazards.
Do not modify the original design without permission of manufacturer.



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S7M-PLUS_DivX_MS10

LGE107DC-RP [S7M+ DIVX/MS10]

NAND FLASH MEMORY

IC102
NAND01GW3B2CN6E
NAND_FLASH_1G_NUMONYX
EAN60762401

/PF_CE0
H : Serial Flash
L : NAND Flash
/PF_CE1
H : 16 bit
L : 8 bit

+3.3V_Normal

R107 1K
R109 3.9K
R1083.3K
C101 0.1uF
R105 1K OPT
R104 10K OPT
R106 1K
R102 10K
Q101 KRC103S OPT

/F_RB
/PF_OE
/PF_CE0
/PF_CE1
PF_ALE
/PF_WE
/PF_WP

NC_1 NC_2 NC_3 NC_4 NC_5 NC_6 RB RE CE NC_7 NC_8 VDD_1 VSS_1 NC_9 NC_10 CL AL WE WP NC_11 NC_12 NC_13 NC_14 NC_15

NC_29 NC_28 NC_27 NC_26 I/O7 I/O6 I/O5 I/O4 NC_25 NC_24 NC_23 VDD_2 VSS_2 NC_22 NC_21 NC_20 I/O3 I/O2 I/O1 I/O0 NC_19 NC_18 NC_17 NC_16

AR101 22
AR102 22

PCM_A[0-7]
PCM_A[7] PCM_A[6] PCM_A[5] PCM_A[4] PCM_A[3] PCM_A[2] PCM_A[1] PCM_A[0]

C102 10uF
C103 0.1uF

<T3 CHIP Config(AUD_LRCH)>

Boot from SPI flash : 1'b0
Boot from NOR flash : 1'b1

<T3 CHIP Config>
(AUD_SCK, AUD_MASTER_CLK, PWM1, PWM0)

MIPS_no_EJ_NOR8 : 4'h3 (MIPS as host. No EJ PAD. Byte mode NAND flash.)
MIPS_EJ1_NOR8 : 4'h4 (MIPS as host. EJ use PAD1. Byte mode NAND flash.)
MIPS_EJ2_NOR8 : 4'h5 (MIPS as host. EJ use PAD2. Byte mode NAND flash.)
B51_Secure_no_scramble : 4'hb (8051 as host. Internal SPI flash secure boot, no scramble)
B51_Sesure_scramble : 4'hc (8051 as host. Internal SPI flash secure boot with scarmble)

+3.3V_Normal
AUD_MASTER_CLK
R148 56
C112 100pF 50V
R115 4.7K
R117 4.7K
R123 4.7K OPT
R125 4.7K OPT
R116 4.7K OPT
R118 4.7K OPT
R121 4.7K
R124 4.7K
R126 4.7K
AUD_LRCH
AUD_SCK
AUD_MASTER_CLK_0
PWM1
PWM0

IC101

PCM_D[0-7] PCM_D[0] PCM_D[1] PCM_D[2] PCM_D[3] PCM_D[4] PCM_D[5] PCM_D[6] PCM_D[7]
U22 T21 T22 AB18 AC18 AC19 AC20 AC21
PCM_D0 PCM_D1 PCM_D2 PCM_D3 PCM_D4 PCM_D5 PCM_D6 PCM_D7

PCM_A[0-14] PCM_A[0] PCM_A[1] PCM_A[2] PCM_A[3] PCM_A[4] PCM_A[5] PCM_A[6] PCM_A[7] PCM_A[8] PCM_A[9] PCM_A[10] PCM_A[11] PCM_A[12] PCM_A[13] PCM_A[14]
U21 V21 Y22 AA22 R22 R21 T23 T24 AA23 Y20 AB17 AA21 U23 Y23 W23
PCM_A0 PCM_A1 PCM_A2 PCM_A3 PCM_A4 PCM_A5 PCM_A6 PCM_A7 PCM_A8 PCM_A9 PCM_A10 PCM_A11 PCM_A12 PCM_A13 PCM_A14

/PCM_REG W22 PCM_REG_N
/PCM_OE AA17 PCM_OE_N
/PCM_WE V22 PCM_WE_N
/PCM_IORD W21 PCM_IORD_N
/PCM_IOWR Y21 PCM_IOWR_N
/PCM_CE AA20 PCM_CE_N
/PCM_IRQA V23 PCM_IRQA_N
/PCM_CD P23 PCM_CD_N
/PCM_WAIT R23 PCM_WAIT_N
PCM_RST P22 PCM_RESET

+5V_Normal
R132 10K
R133 10K
C108 0.1uF OPT
C109 0.1uF

/PF_CE0 AC17 PCM_PF_CE0Z
/PF_CE1 AB20 PCM_PF_CE1Z
/PF_OE AA18 PCM_PF_OEZ
/PF_WE AB21 PCM_PF_WEZ
PF_ALE AB19 PCM_PF_ALE
/PF_WP AD17 PCM_PF_AD[15]
/F_RB AA19 PCM_PF_RBZ
AR104 22
AR103 22

S7_NEC_TXD R134 22 M23 UART_TX2/GPIO65
S7_NEC_RXD R135 22 N23 UART_RX2/GPIO64

for SYSTEM/HDCP EEPROM&URSA3
I2C_SDA R136 22 M22 DDCR_DA/GPIO71
I2C_SCL R137 22 N22 DDCR_CK/GPIO72
RGB_DDC_SDA R138 22 A5 DDCA_DA/UART0_TX
RGB_DDC_SCL R139 22 B5 DDCA_CK/UART0_RX

TO SCART1
PWM0 K23 PWM0/GPIO66
PWM1 K22 PWM1/GPIO67
PWM2 G23 PWM2/GPIO68
SC_RE2 G22 PWM3/GPIO69
SC_RE1 G21 PWM4/GPIO70

DSUB_DET C6 SAR0/GPIO31
MODEL_OPT_3 B6 SAR1/GPIO32
PCM_5V_CTL C8 SAR2/GPIO33
/RST-PHY C7 SAR3/GPIO34
A6 SAR4/GPIO35
3D SG M_RFModule_RESET

GPIO143/TCON0 N21 5V_DET_HDMI_1
GPIO145/TCON2 M21 5V_DET_HDMI_2
GPIO147/TCON4 L22 5V_DET_HDMI_4
GPIO149/TCON6 L21
GPIO151/TCON8 P21 SIDEAV_DET

GPIO36/UART3_RX K21 M_REMOTE_RX 3D SG
GPIO37/UART3_TX L23 M_REMOTE_TX 3D SG
GPIO38 K20 ET_RXER
GPIO39 L20 FRC_RESET
GPIO40 M20 SC1/COMP1_DET
GPIO41 G20 ERROR_OUT
GPIO42 G19 MODEL_OPT_0

GPIO50/UART1_RX F20 DC_MREMOTE 3D SG
GPIO51/UART1_TX F19 DD_MREMOTE 3D SG

GPIO6/PM0/INT0 E7 USB1_OCD
GPIO7/PM1/PM_UART_TX D7 USB1_CTL
GPIO8/PM2 E11 HP_DET
GPIO9/PM3 G9 CONTROL_ATTEN
GPIO10/PM4 F9 MODEL_OPT_6
C5 MODEL_OPT_1
GPIO11/PM5/PM_UART_RX/INT1 E8 33 R146 /FLASH_WP
PM_SPI_CS1/GPIO12/PM6 E9 MODEL_OPT_2
PM_SPI_WP1/GPIO13/PM7 F7 TUNER_RESET
PM_SPI_WP2/GPIO14/PM8/INT2 F6 DEMOD_RESET
GPIO15/PM9 D8 AV_CVBS_DET
PM_SPI_CS2/GPIO16/PM10 G12
GPIO17/PM11/INT3 F10
GPIO18/PM12/INT4

PM_SPI_CK/GPIO1 D9 33 R147 SPI_SCK
GPIO0/PM_SPI_CZ D11 /SPI_CS
PM_SPI_DI/GPIO2 E10 SPI_SDI
PM_SPI_DO/GPIO3 D10 33 R151 SPI_SDO
for SERIAL FLASH

TS0_CLK AA9 CI_TS_CLK
TS0_VLD AA5 CI_TS_VAL
TS0_SYNC AA10 CI_TS_SYNC
from CI SLOT
TS0_D0 AB5 CI_TS_DATA[0]
TS0_D1 AC4 CI_TS_DATA[1]
TS0_D2 Y6 CI_TS_DATA[2]
TS0_D3 AA6 CI_TS_DATA[3]
TS0_D4 W6 CI_TS_DATA[4]
TS0_D5 AA7 CI_TS_DATA[5]
TS0_D6 Y9 CI_TS_DATA[6]
TS0_D7 AA8 CI_TS_DATA[7] CI_TS_DATA[0-7]

TS1_CLK AC5 FE_TS_CLK
TS1_VLD AC6 FE_TS_VAL_ERR
TS1_SYNC AB6 FE_TS_SYNC
Internal demod out /External demod in
TS1_D0 AC10 FE_TS_DATA[0]
TS1_D1 AB10 FE_TS_DATA[1]
TS1_D2 AC9 FE_TS_DATA[2]
TS1_D3 AB9 FE_TS_DATA[3]
TS1_D4 AC8 FE_TS_DATA[4]
TS1_D5 AB8 FE_TS_DATA[5]
TS1_D6 AC7 FE_TS_DATA[6]
TS1_D7 AB7 FE_TS_DATA[7] FE_TS_DATA[0-7]

MPIF_CLK D12
MPIF_CS_N D14 Delete /PIF_SPI_CS
MPIF_BUSY R160 1K E14
MPIF_D0 E12
MPIF_D1 F12
MPIF_D2 D13
MPIF_D3 E13

NAND_FLASH_1G_HYNIX

EAN35669102
IC102-*1
H27U1G8F2BTR-BC

NC_1 NC_2 NC_3 NC_4 NC_5 NC_6 R/B RE CE NC_7 NC_8 VCC_1 VSS_1 NC_9 NC_10 CLE ALE WE WP NC_11 NC_12 NC_13 NC_14 NC_15
NC_29 NC_28 NC_27 NC_26 I/O7 I/O6 I/O5 I/O4 NC_25 NC_24 NC_23 VCC_2 VSS_2 NC_22 NC_21 NC_20 I/O3 I/O2 I/O1 I/O0 NC_19 NC_18 NC_17 NC_16

NAND_FLASH_1G_SS

EAN61857001
IC102-*2
K9F1G08U0D-SCB0

NC_1 NC_2 NC_3 NC_4 NC_5 NC_6 R/B RE CE NC_7 NC_8 VCC_1 VSS_1 NC_9 NC_10 CLE ALE WE WP NC_11 NC_12 NC_13 NC_14 NC_15
NC_29 NC_28 NC_27 NC_26 I/O7 I/O6 I/O5 I/O4 NC_25 NC_24 NC_23 VCC_2 VSS_2 NC_22 NC_21 NC_20 I/O3 I/O2 I/O1 I/O0 NC_19 NC_18 NC_17 NC_16

NAND_FLASH_1G_TOSHIBA

EAN61508001
IC102-*3
TC58NVG0S3ETA0BBBH

NC_1 NC_2 NC_3 NC_4 NC_5 NC_6 RY/BY RE CE NC_7 NC_8 VCC_1 VSS_1 NC_9 NC_10 CLE ALE WE WP NC_11 NC_12 NC_13 NC_14 NC_15
NC_29 NC_28 NC_27 NC_26 I/O8 I/O7 I/O6 I/O5 NC_25 NC_24 NC_23 VCC_2 VSS_2 NC_22 NC_21 NC_20 I/O4 I/O3 I/O2 I/O1 I/O0 NC_19 NC_18 NC_17 NC_16

S7R

S7R_BASIC S7R_MS10 S7R_DivX S7R_DivX_MS10 S7R_RM

S7MR

S7MR_BASIC S7MR_MS10 S7MR_DivX S7MR_DivX_MS10 S7MR_RM

S7MR-PLUS

S7M-PLUS_BASIC S7M-PLUS_MS10 S7M-PLUS_DivX S7M-PLUS_RM

FRC_SCL
FRC_SDA

IC103-*1
CAT24C08WI-GT3-H-RECV(TV)
HDCP_EEPROM_ON_SEMI_NEW

EEPROM_1MBIT_ATMEL
IC104-*1
AT24C1024BN-SH-T

HDCP EEPROM

+3.3V_Normal
Addr:10101--
HDCP_EEPROM_CATALYST_OLD
IC103
CAT24WC08W-T
R113 4.7K
A0 A1 A2 VSS VCC WP SCL SDA
$0.199
C107 0.1uF
R127 4.7K
R128 22
R129 22
I2C_SCL
I2C_SDA

EEPROM

EEPROM_1MBIT_ST
IC104
M24M01-HRMN6TP
A0'h
C105 0.1uF
R111 22 I2C_SCL
R112 22 I2C_SDA
C104 8pF OPT
C106 8pF OPT

I2C

+3.3V_Normal
R140 10K
R141 10K
R142 3.3K
R143 3.3K
R144 2.2K
R145 2.2K
AMP_SDA
AMP_SCL
I2C_SDA
I2C_SCL
NEC_SDA
NEC_SCL

DIMMING

A_DIM R156 10K PWM0
PWM_DIM R157 100 PWM2
R155 0 OPT
C111 2.2uF
LD650 Scan
SCAN_BLK2 R158 100 OPT FRC_PWM1
SCAN_BLK1/OPC_OUT R159 100 OPT FRC_PWM0

THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET
LGElectronics

LG ELECTRONICS

MODEL	GP3_Saturn7M	DATE	Ver. 0.1
BLOCK	FLASH/EEPROM/GPIO	SHEET	1

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MODEL OPTION

PIN NAME	PIN NO.	LOW	HIGH
MODEL_OPT_0	G19	NO FRC	FRC_HW_OPT
MODEL_OPT_4	E18	50/60Hz LVDS	100/120Hz LVDS
MODEL_OPT_1	C5	PHM_OFF	PHM_ON
MODEL_OPT_2	F7	NON_DVB_T2	DVB_T2
MODEL_OPT_3	B6	HD	FHD
MODEL_OPT_5	D18	Ready	default
MODEL_OPT_6	F9	LCD	OLED

NO_FRC : LOW LOW
U3_INTERNAL : HIGH LOW
U5_EXTERNALBOOT :HIGH HIGH
reserved for FRC : LOW HIGH

--> This option is only applied in EU.
In case of NON_EU, default value set LOW.

-->In case of GP2, This port was used for GIP/NON_GIP

--> MODEL_OPT_5, MODEL_OPT_6
: Only 3D_SG GPIO OUTPUT CONTROL

RSDS Power OPT

VDDC 1.26V

VDDC : 2026mA

Normal Power 3.3V

Normal 2.5V

DDR3 1.5V

RSDS Power OPT

S7M-PLUS_DivX_MS10 IC101 LGE107DC-RP [S7M+ DIVX/MS10]

HDMI

DSUB

SCART1_RGB/COMP1

COMP2

CVBS In/OUT

Delete CHB_CVBS_IN

Close to MSTAR

Close to MSTAR DTV_IF

ANALOG SIF Close to MSTAR

TU/DEMOD_I2C

B/T USB

SIDE USB

I2S_I/F

AUDIO IN

AUDIO OUT

H/P OUT

THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET
LGElectronics

LG ELECTRONICS

MODEL	GP2R	DATE	20101023
BLOCK	MAIN2, HW OPT	SHEET	2 /

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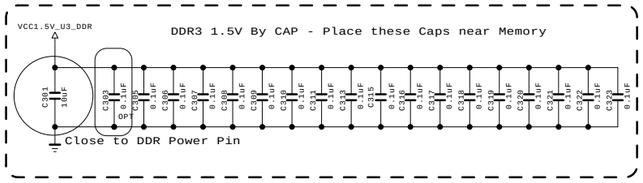
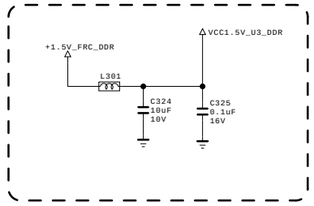
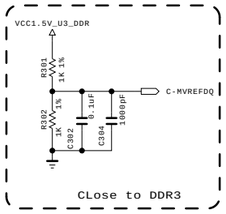
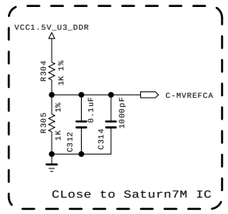


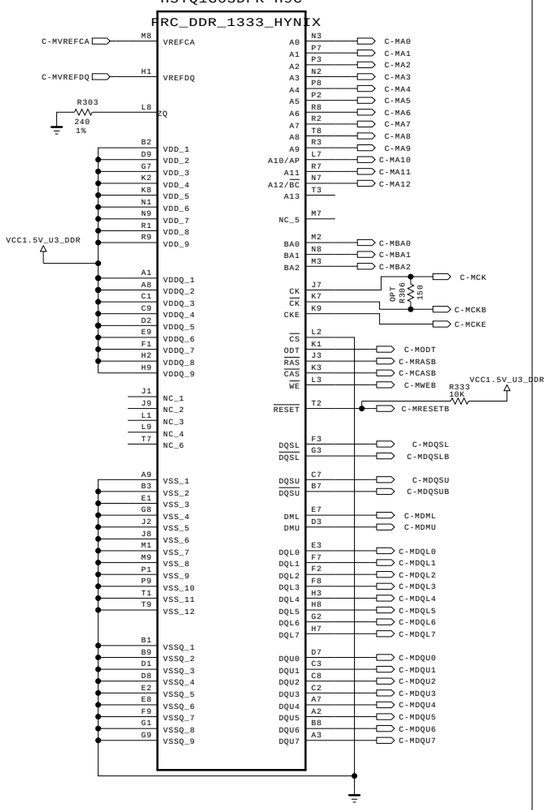


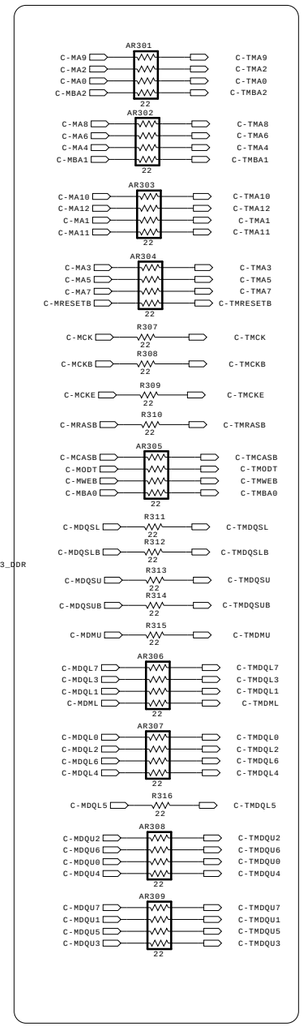




EAN61829001

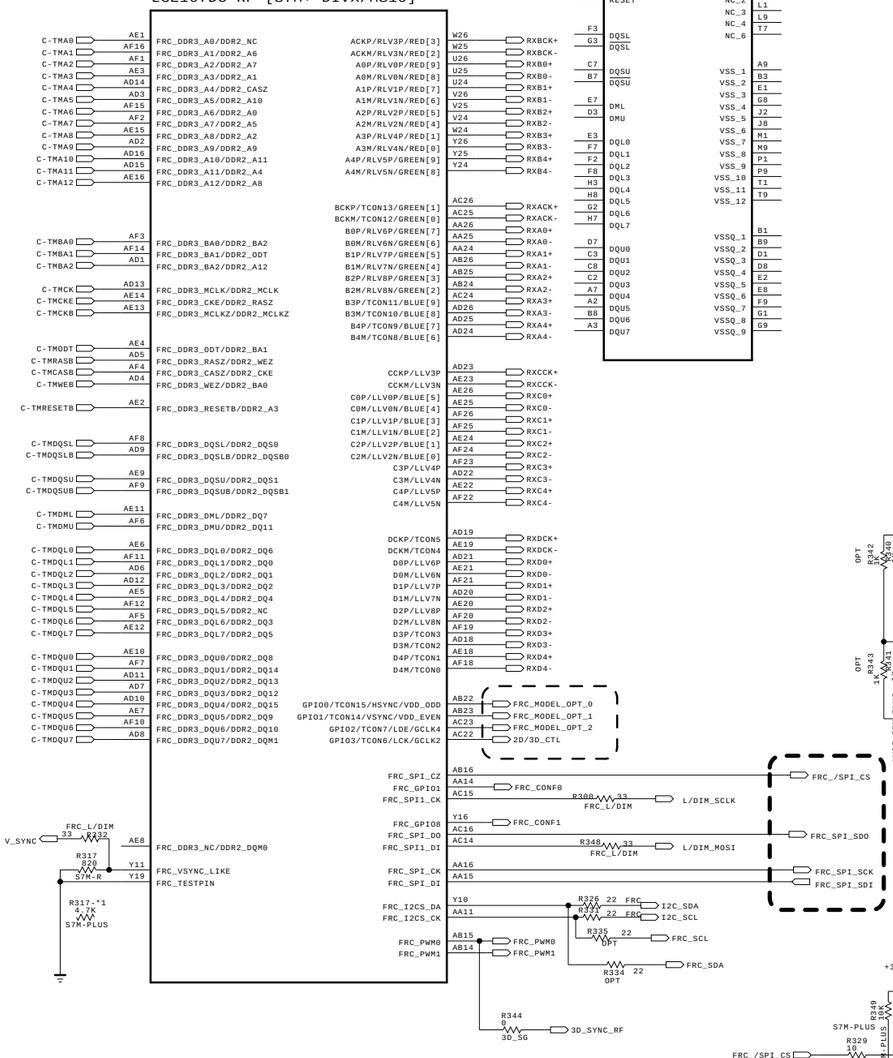
IC301 H5TQ1G63DFR-H9C





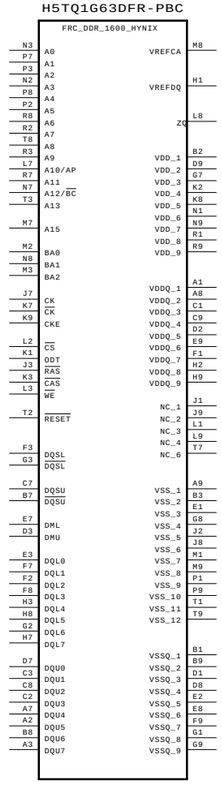
S7M-PLUS_DivX_MS10

IC101 LGE107DC-RP [S7M+ DIVX/MS10]



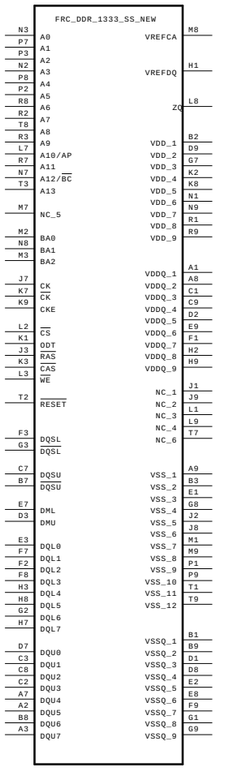
EAN61829001

IC301-*2 H5TQ1G63DFR-PBC



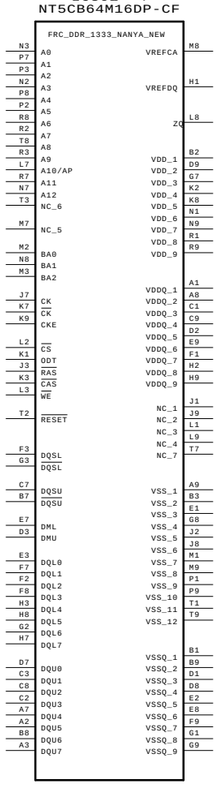
EAN61857101

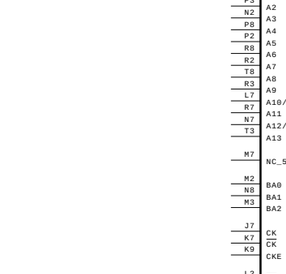
IC301-*3 K4B1G1646G-BCH9

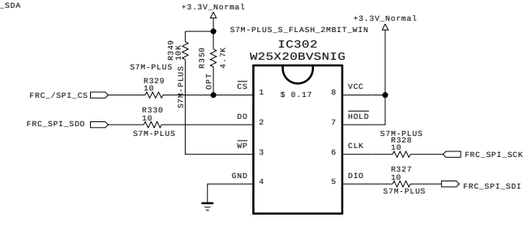


EAN61857201

IC301-*4 NT5CB64M16DP-CF







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MODEL	GP2R	DATE	20101023
BLOCK	FRC_DDR	SHEET	3

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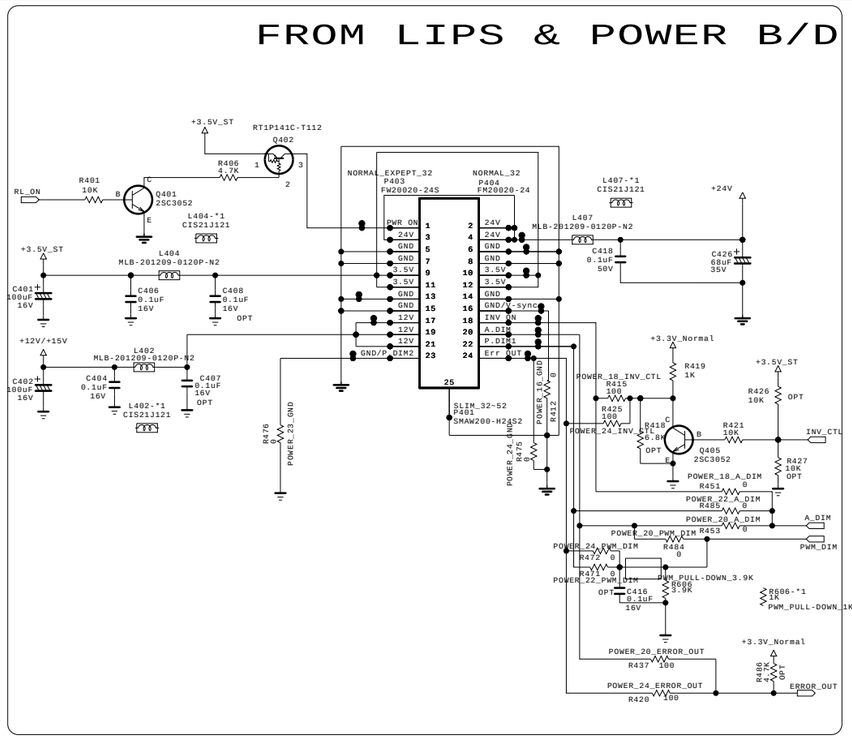

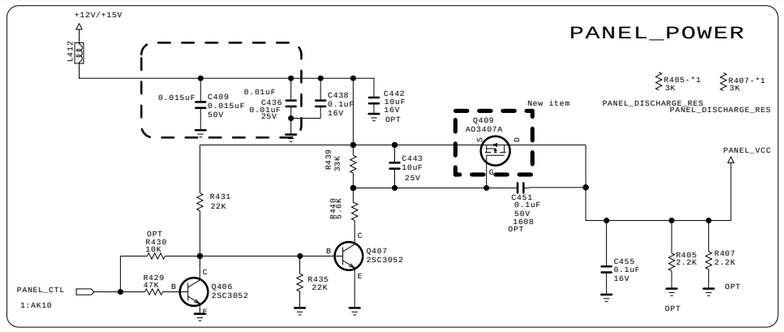

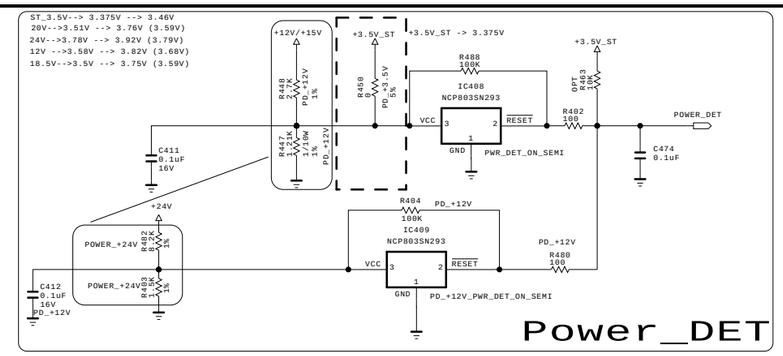

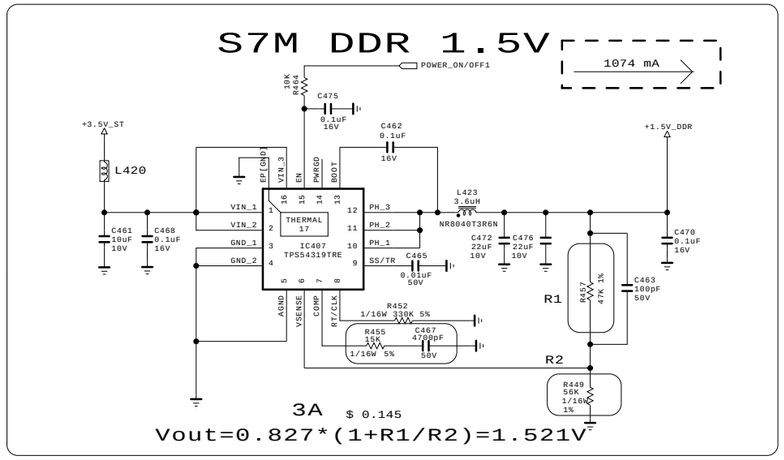

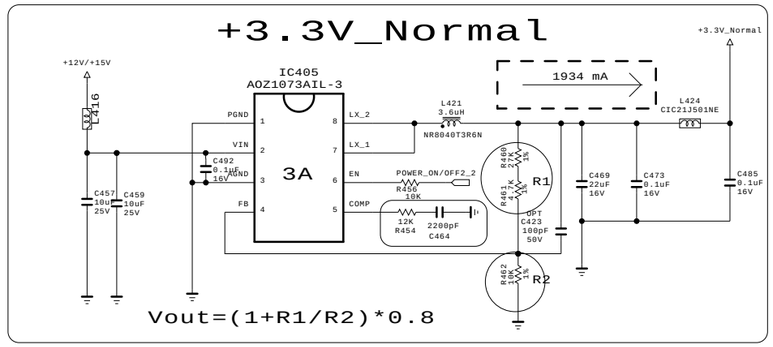

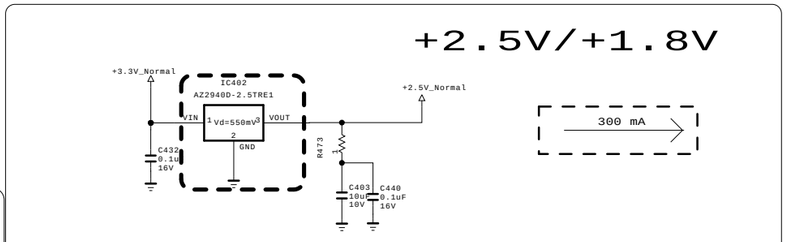

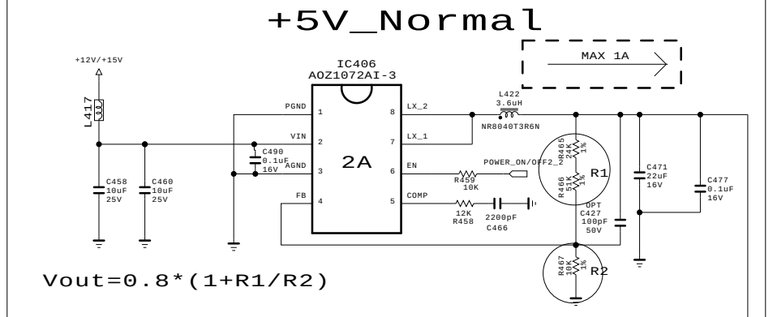

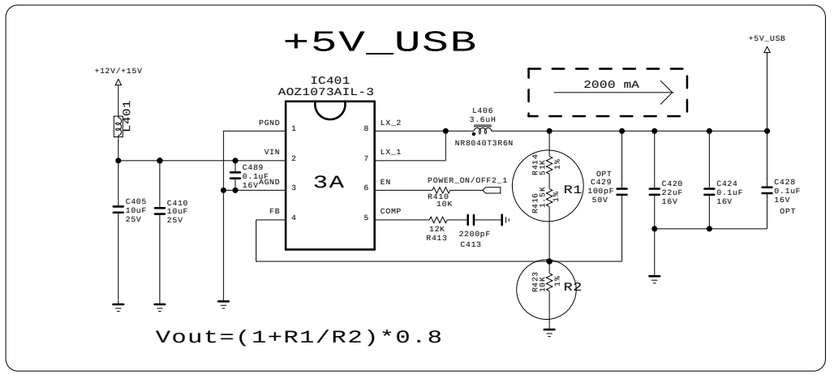

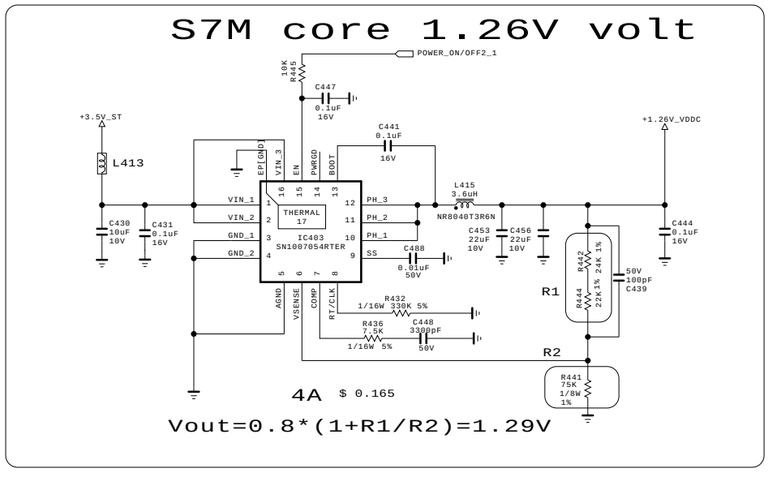

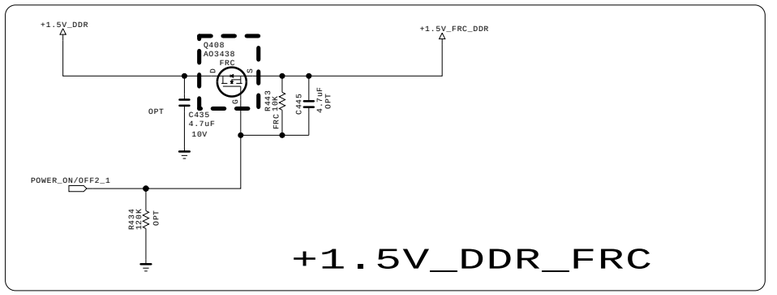

<MODULE PIN MAP>

PIN No	LGD(PSU) or LIPS	CMO10"Lamp (PSU)	AUO 10"Lamp (PSU)	SHARP (PSU)	IPS-@ (PSU)
16	GND	GND	GND	GND	GND
18	INV_ON	A-DIM	INV_ON	INV_ON	INV_ON
20	VBR-A	NC	Err_out	52/60:ERROR 26/32HD:NC	Err_out
22	PWM_DIM	PWM_DIM	NC	26/32/52:PWM 60:NC	NC
24	Err_out	INV_ON	PWM_DIM	26/32/52:GND 60:PWM	PWM_DIM
23	GND	GND	GND	GND	GND

TP5302 OLP
TP5303 V_SYNC
TP5304 SCAN_BLK2
TP5305 SCAN_BLK1/OPC_OUT
TP5306 OPC_OUT

<LED MODULE PIN MAP -> latest update 20100618>

PIN No	LGD LPB/ OS LPB	32LE5300-TA CMO10"LED (PSU)	32LE4500-TA AUO 10"LED (PSU)	32LE5300-TA LGD 10"LED (PSU)	
16	NC	NC	NC	NC	
18	INV_ON	INV_ON	INV_ON	INV_ON	
20	NC	err_out --> NC	err_out --> NC	NC	
22	PWM_DIM	NC	NC	PWM_DIM	
24	err_out --> NC	PWM_DIM	PWM_DIM	err_out --> NC	
23	NC	NC	NC	NC	

LGD edge led error-out use or not? checking is necessary...

<Module Inv to Main Pin Connection>

INV	<-->	MAIN
#11	<-->	#24
#12	<-->	#18
#13	<-->	#20
#14	<-->	#22

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MODEL	GP2R	DATE	20101023
BLOCK	POWER_LARGE	SHEET	4

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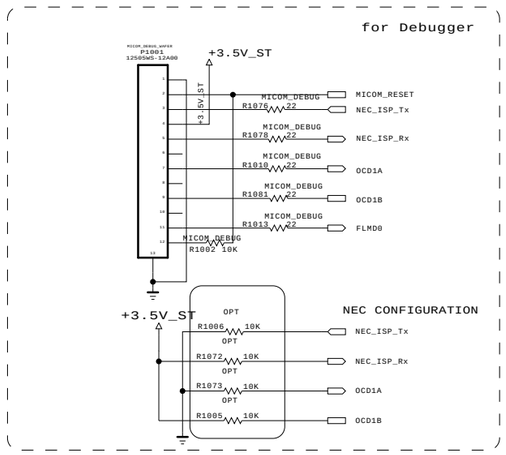

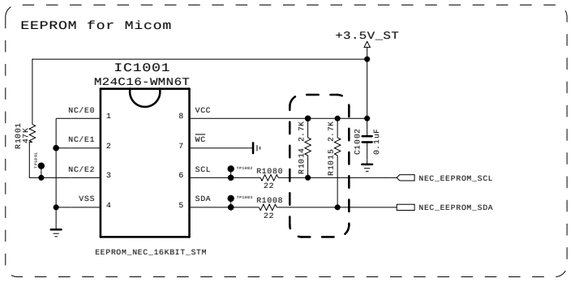

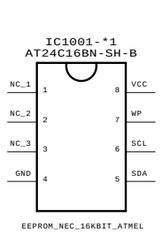

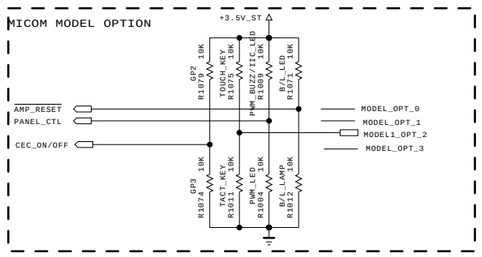

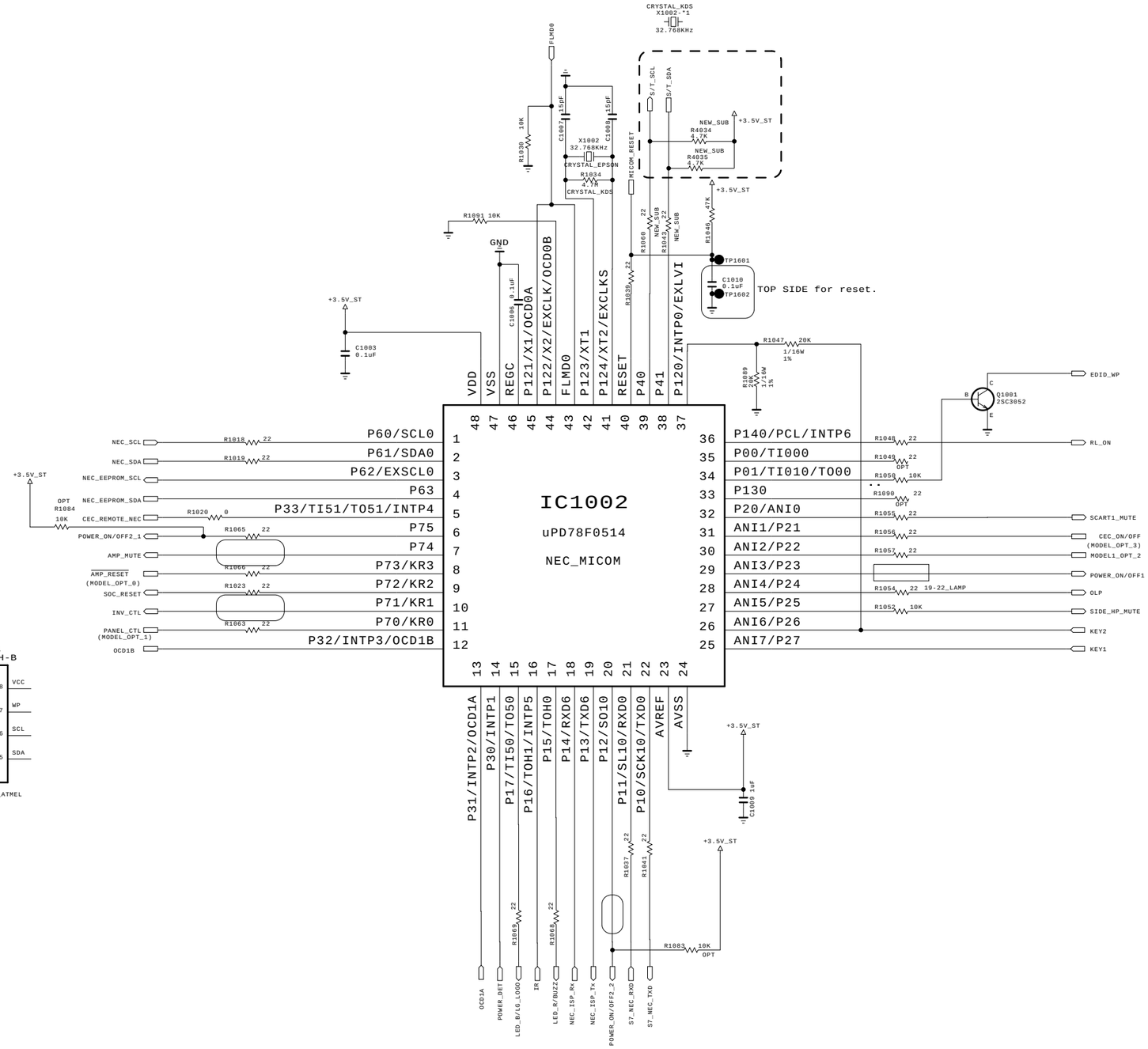

2011Y,GP2R, 101125 Update

MODEL OPTION

PIN NAME	PIN NO.	HIGH	LOW
MODEL_OPT_0	8	B/L_LED	B/L_LAMP
MODEL_OPT_1	11	PWM_BUZZ/IIC_LED	PWM_LED
MODEL_OPT_2	30	TOUCH_KEY	TACT_KEY
MODEL_OPT_3	31	GP2	GP3

PWM_BUZZ/IIC_LED :Using IIC for LED Breathing & PWM Buzz
PWM_LED : Using PWM Signal for LED Lighting

MODEL_OPT_0	MODEL_OPT_1	MODEL_OPT_2	MODEL_OPT_3	Description
LOW	LOW	LOW	LOW	LK330/LK430 for KR/US 10Y EYE-Q Sensor KEY & PWM LED & No Buzz & No LED Blink
LOW	LOW	LOW	HIGH	LK330/LK430/LK530 KEY & PWM LED & No Buzz & No LED Blink
LOW : LED HIGH : LAMP	HIGH	HIGH	LOW	LV25/LV35/LV45/LW45/LV55/LK45/LK55 S/T & IIC LED & NO BUZZ & LED Blink
	HIGH	LOW	LOW	TBD IIC LED(09Y IIC Protocol) & No BUZZ
	LOW	HIGH	LOW	TBD S/T & IIC LED & No Buzz & LED Blink

2010Y,GP2

MODEL OPTION

PIN NAME	PIN NO.	HIGH	LOW
MODEL_OPT_0	8	B/L_LED	B/L_LAMP
MODEL_OPT_1	11	PWM_BUZZ/IIC_LED	PWM_LED
MODEL_OPT_2	30	TOUCH_KEY	TACT_KEY
MODEL_OPT_3	31	GPIO_LED	NON_GPIO_LED

PWM_BUZZ/IIC_LED : For model that use LED Lighting used IIC
PWM_LED : For model that use LED Lighting used PWM Signal

MODEL_OPT_0	MODEL_OPT_1	MODEL_OPT_2	MODEL_OPT_3	
LOW	LOW	LOW	LOW	LD350/450/550 PWM LED & No Buzz & No LED Blink
HIGH	LOW	HIGH	LOW	19/22/26LE5300/5300 IIC LED & PWM IIC BUZZ
HIGH	HIGH	HIGH	LOW	32/37/42/47/55LE5300 IIC LED & PWM BUZZ
LOW	HIGH	LOW	LOW	LD420 IIC LED(09Y IIC Protocol) & No BUZZ
HIGH	LOW	LOW	HIGH	LE7300 GPIO LED & NO BUZZ

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MODEL	GP2R	DATE	20101125
BLOCK	MICOM Rev.4	SHEET	5

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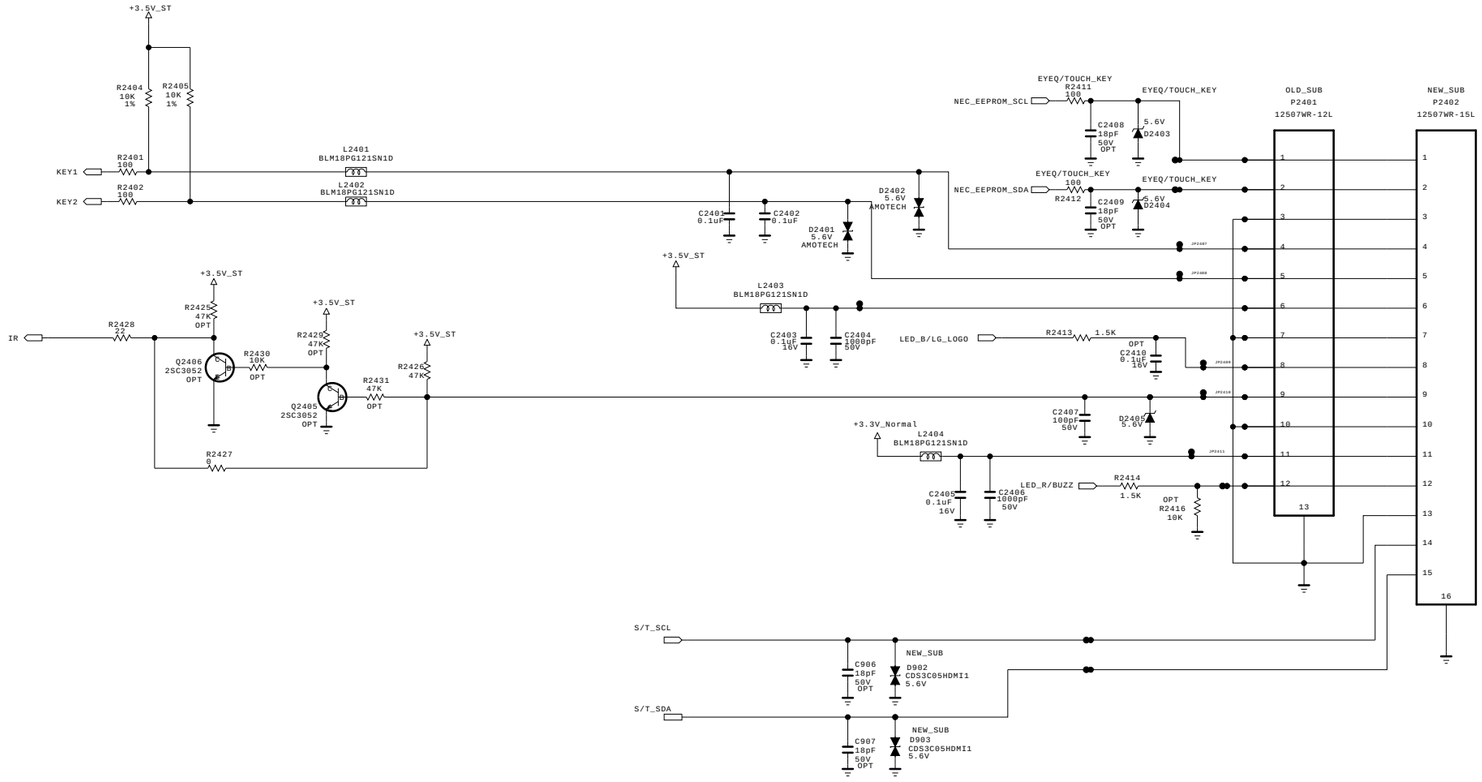
CONTROL
IR & LED



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MODEL	GP2R	DATE	20101023
BLOCK	IR/CONTROL-L	SHEET	6

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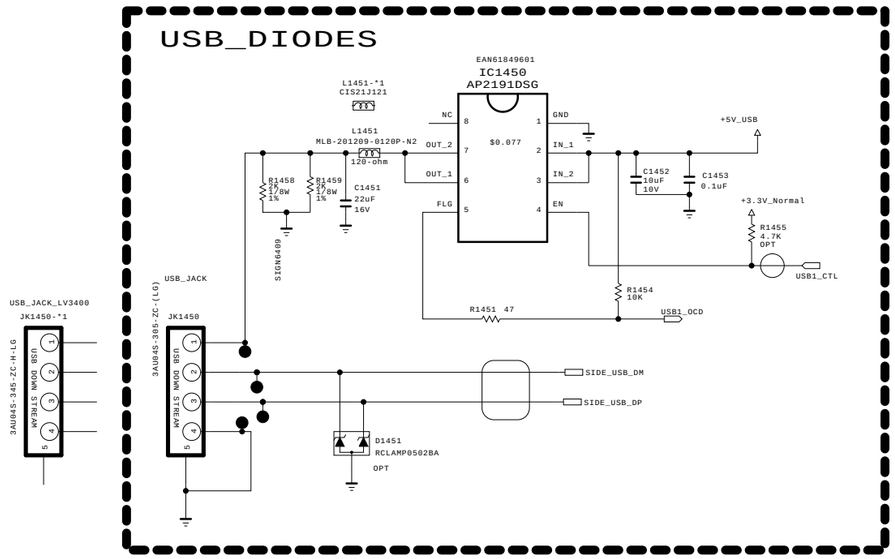

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MODEL	GP2R	DATE	20101023
BLOCK	USB_OCP_DIODE	SHEET	7 /

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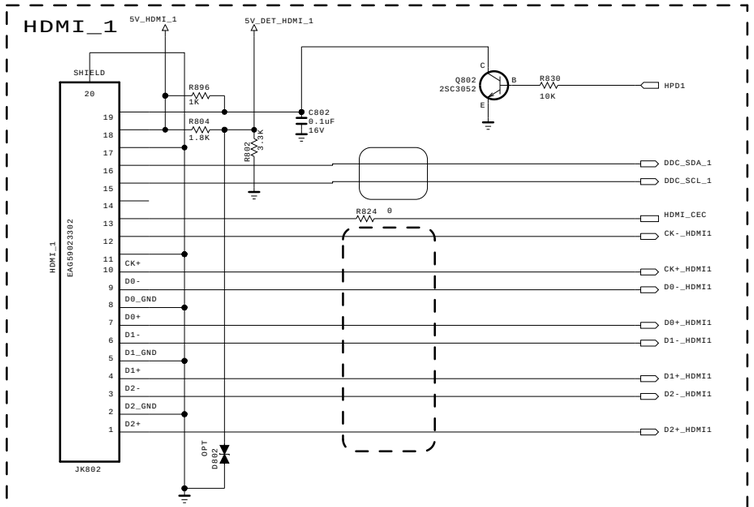
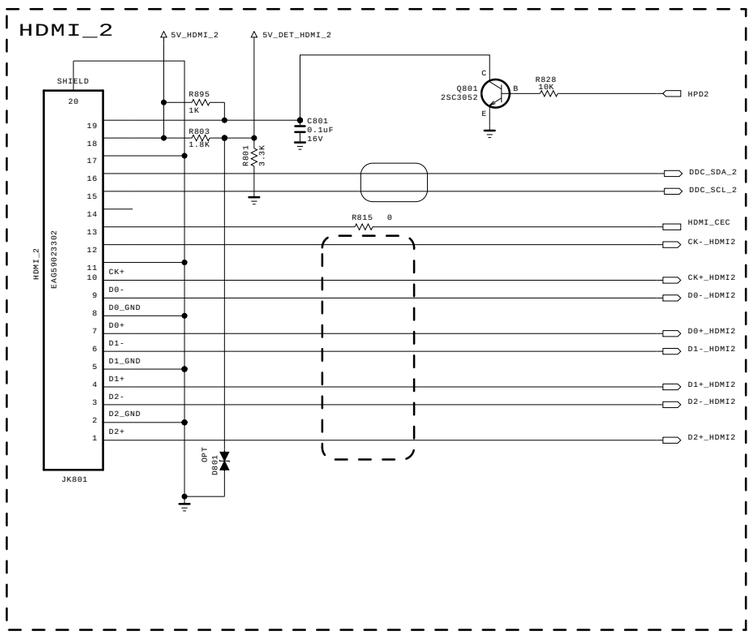
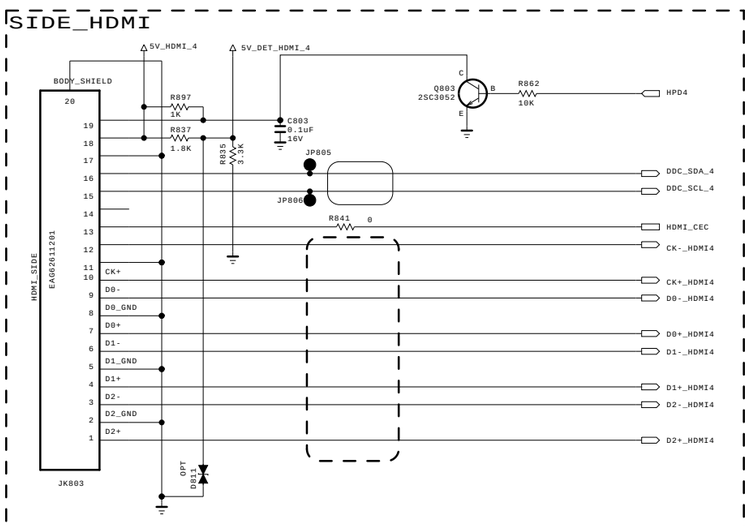
HDMI_1



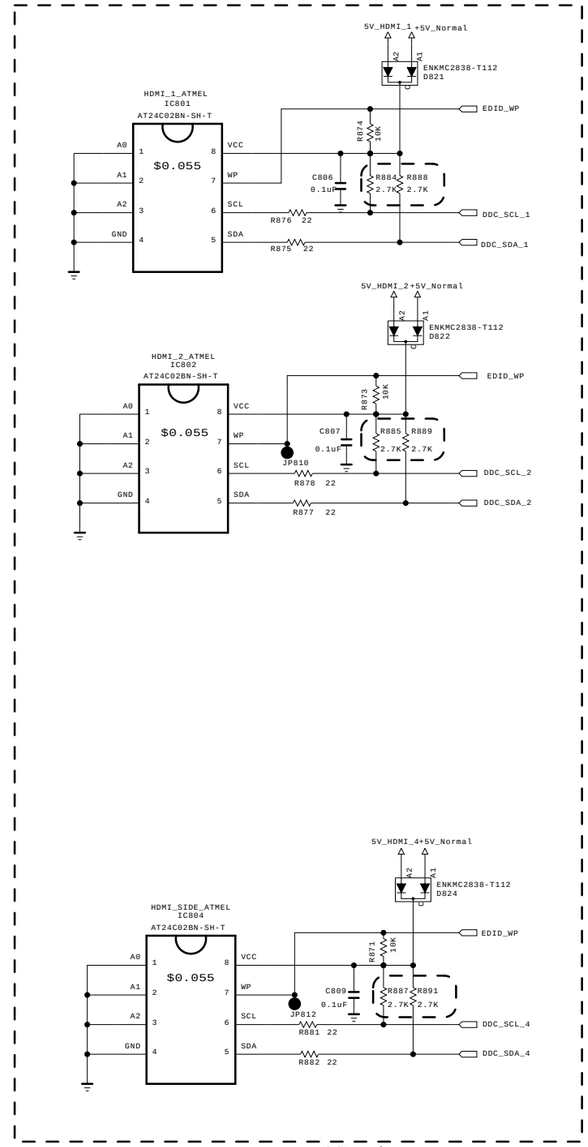
HDMI_2



SIDE_HDMI



HDMI EEPROM



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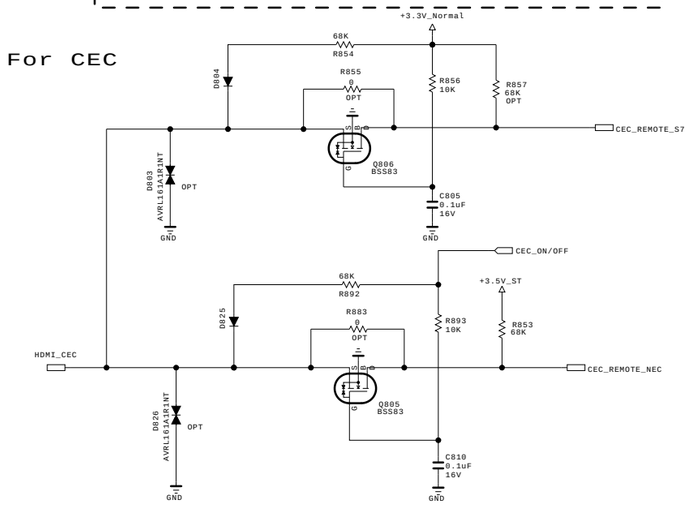

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MODEL	GP2R	DATE	20101023
BLOCK	HDMI	SHEET	8 /

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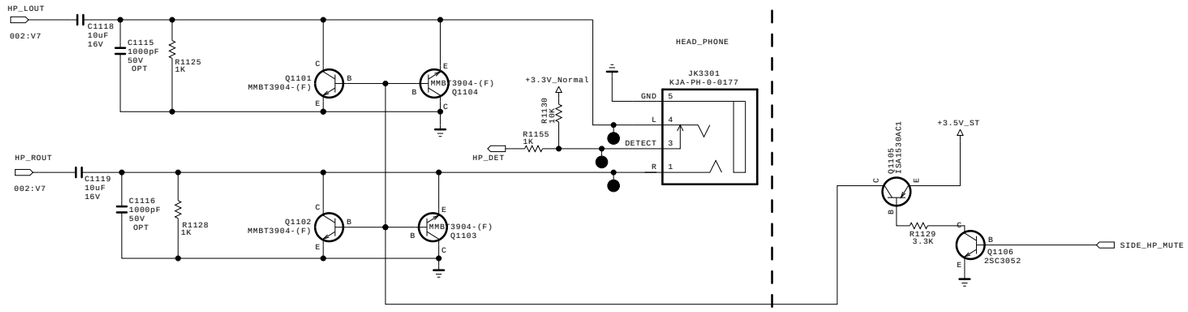
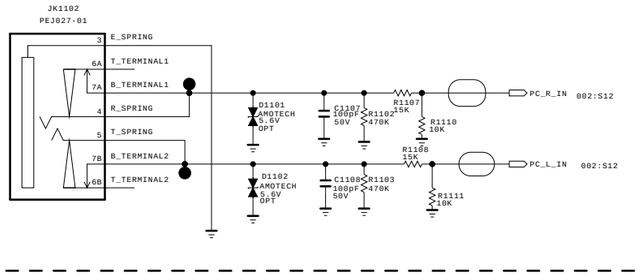
RGB/SPDIF/PC/HP

New Item Development

EARPHONE BLOCK

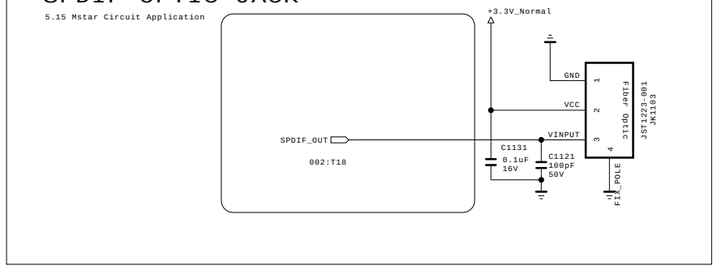


PC AUDIO

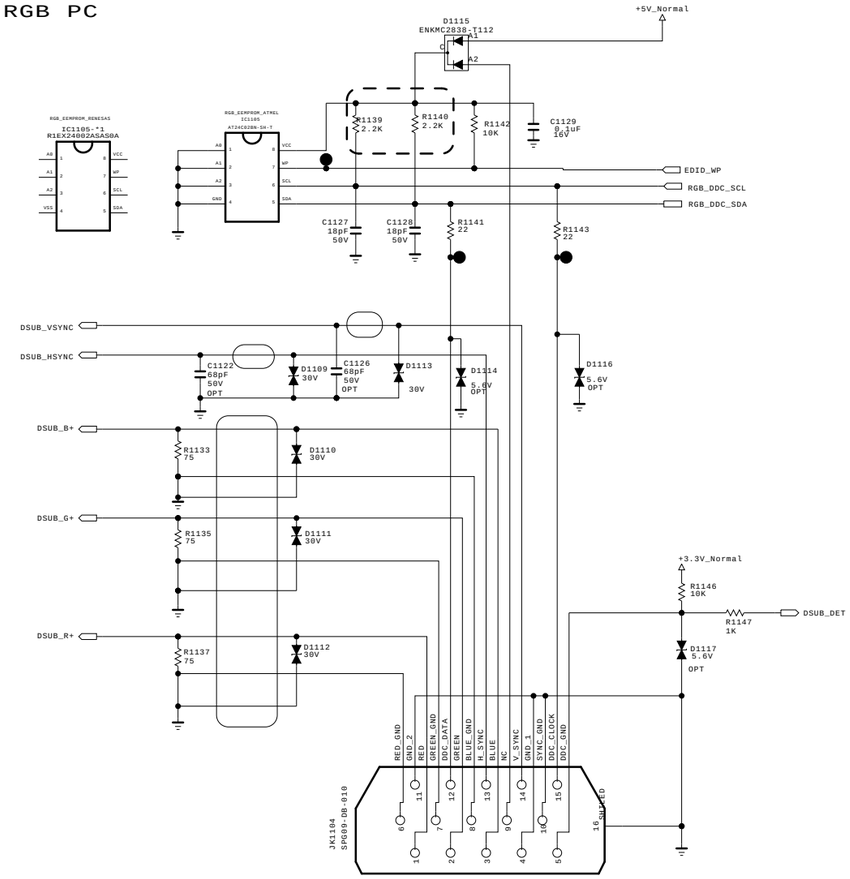


SPDIF OPTIC JACK

5.15 Mstar Circuit Application



RGB PC



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MODEL	GP2R	DATE	20101023
BLOCK	RGB/SPDIF/HP	SHEET	9

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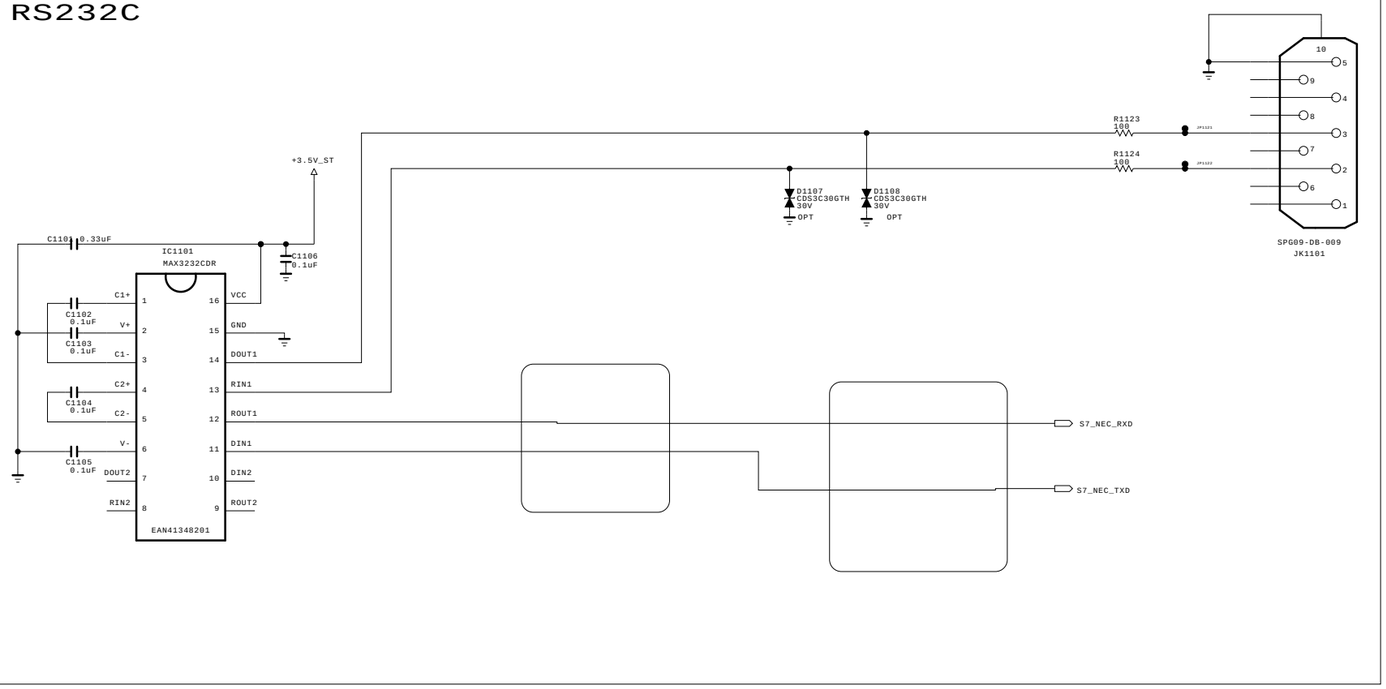
RS232C



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MODEL	GP2R	DATE	20101023
BLOCK	RS232C_9PIN	SHEET	10

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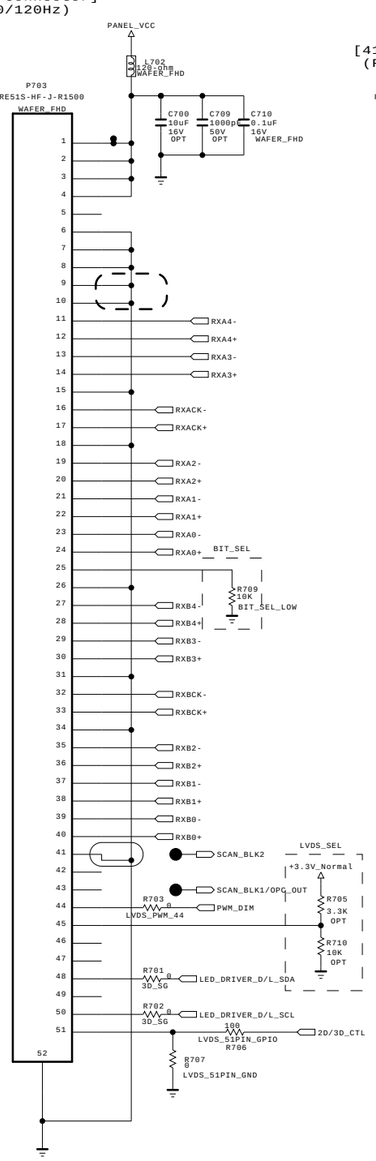
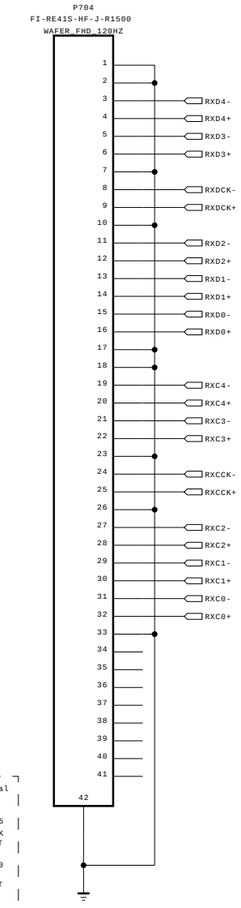
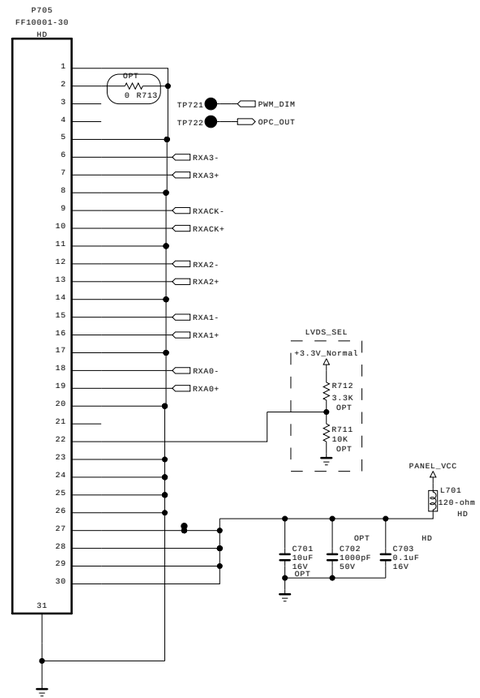
[51Pin LVDS Connector]
(For FHD 60/120Hz)



[41Pin LVDS Connector]
(For FHD 120Hz)



[30Pin LVDS Connector]
(For HD 60Hz_Normal)



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MODEL	GP2R	DATE	20101023
BLOCK	LVDS_LARGE	SHEET	11

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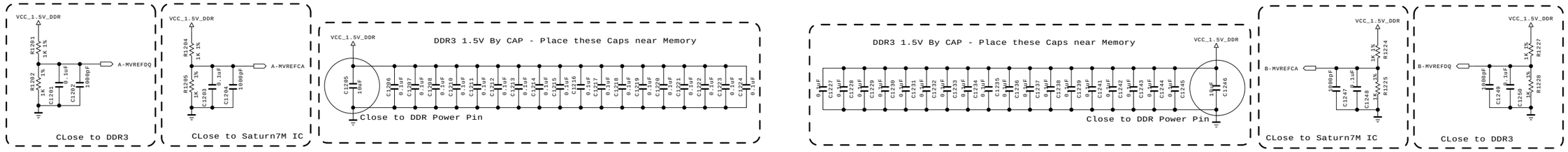

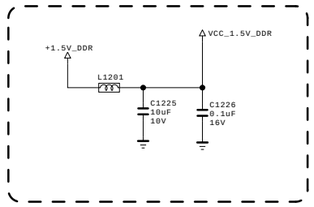

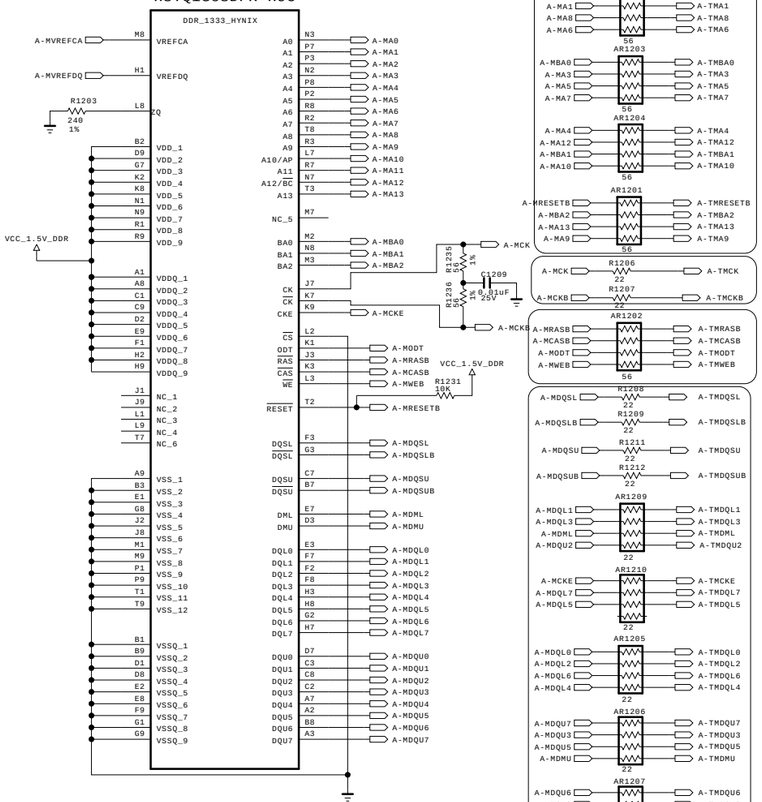

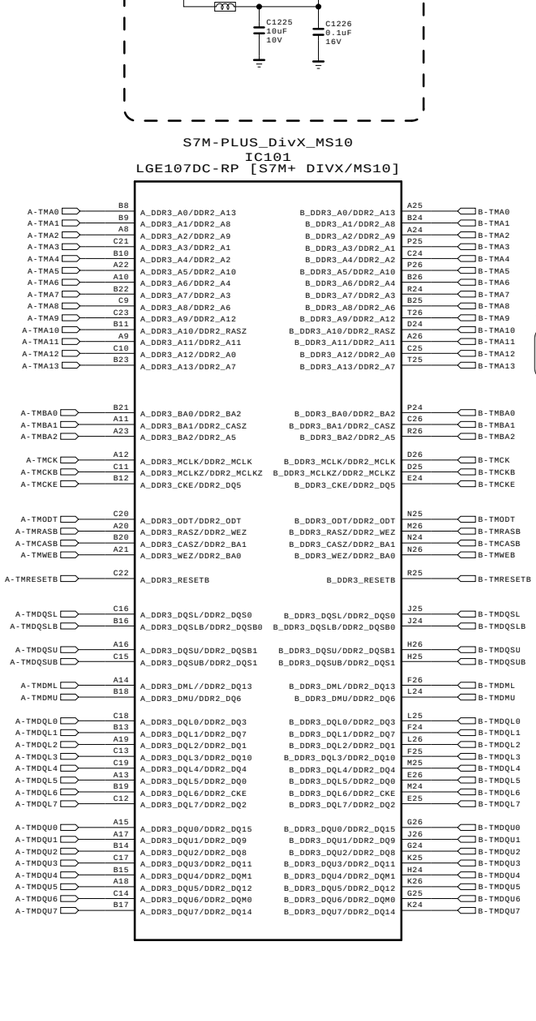

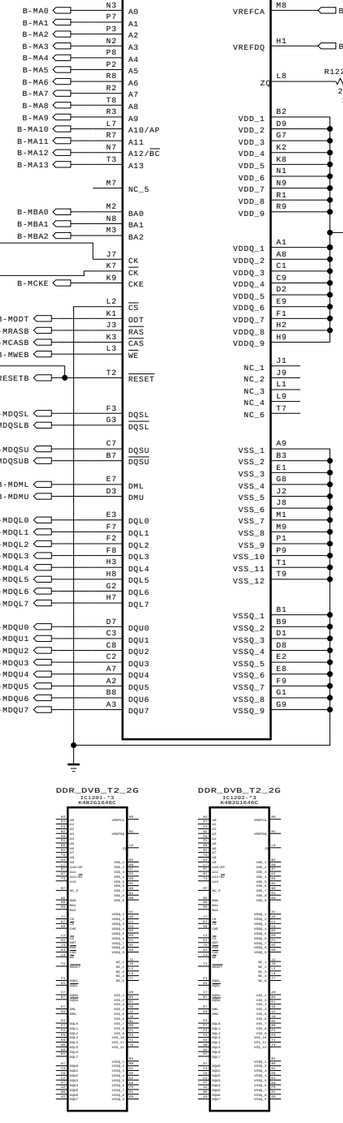

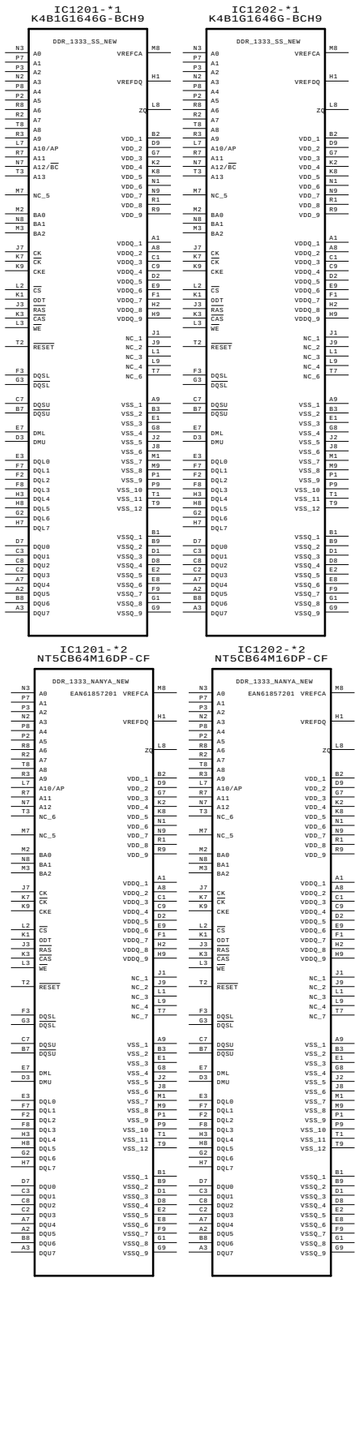

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MODEL	GP2R	DATE	20101023
BLOCK	DDR_256	SHEET	12 /

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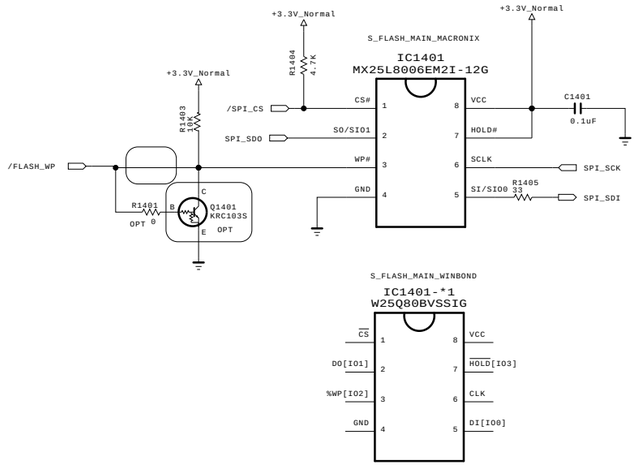

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LG ELECTRONICS

MODEL	GP2R	DATE	20101023
BLOCK	SFLASH_1MB	SHEET	13 /

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GP2R_LARGE_TUNER

TU3702
TDTJ-S001D

DVB_1INPUT_H_LGIT

1	ANT_PWR[OPT]
2	BST_CNTL
3	+B
4	NC[RF_AGC]
5	AS
6	SCL
7	SDA
8	NC[IF_TP]
9	SIF
10	NC
11	VIDEO
12	GND
13	1.2V
14	3.3V
15	RESET
16	IF_AGC_CNTL
17	DIF_1
18	DIF_2
19	SHIELD

CN_2INPUT_H_LG3911

TU3701
TDFR-C036D

1	RF_S/W_CNTL
2	BST_CNTL
3	+B1[+5V]
4	NC[RF_AGC]
5	NC_1
6	SCLT
7	SDAT
8	NC_2
9	SIF
10	NC_3
11	VIDEO
12	GND
13	+B2[1.2V]
14	+B3[3.3V]
15	RESET
16	NC_4
17	SCL
18	SDA
19	ERR
20	SYNC
21	VALID
22	MCL
23	D0
24	D1
25	D2
26	D3
27	D4
28	D5
29	D6
30	D7
31	SHIELD

RF_SWITCH_CTL
Pull-up can't be applied because of MODEL_OPT_2

close to TUNER
OPT R3762 0 CONTROL_ATTEN

close to TUNER
R3705 0 C3701 0.1uF 16V RF_SW_OPT

+5V_TU
C3703 100pF 50V
C3704 0.1uF 16V

OPTION : RF AGC
C3728 0.1uF 16V OPT
C3731 10uF 10V OPT
Q3704 2SC3052 OPT
R3754 10K OPT
FE_AGC_SPEED_CTL
IF_AGC_SEL

GPIO must be added.

R3707 0 OPT
C3706 0.1uF 16V

close to TUNER
C3702 0.1uF 16V

+1.2V/+1.8V_TU
+3.3V_TU
CN C3739 10uF 6.3V
C3707 100pF 50V
C3708 0.1uF 16V
close to the tuner pin, add,09029

C3737 100pF 50V
C3738 0.1uF 16V
C3705 100pF 16V
FULL_NIM

R3732 100
R3733 180K
C3710 0.1uF 16V
TUNER_RESET

R3702 100 FULL_NIM
R3701 100 FULL_NIM
close to IF line

HALF_NIM R3760 0
R3761 0 HALF_NIM
Close to the tuner

IF_N_MSTAR
IF_P_MSTAR
1. should be guarded by ground
2. No via on both of them
3. Signal Width >= 12mils
Signal to Signal Width = 12mils
Ground Width >= 24mils

FULL_NIM R3724 0 FE_TS_SYNC
FULL_NIM R3730 0 FE_TS_VAL_ERR
FULL_NIM R3731 0 FE_TS_CLK
FULL_NIM_CHINA R3725 0 FE_TS_DATA[0]
FULL_NIM R3727 0 FE_TS_DATA[1]
FULL_NIM R3728 0 FE_TS_DATA[2]
FULL_NIM R3729 0 FE_TS_DATA[3]
FULL_NIM R3726 0 FE_TS_DATA[4]
FULL_NIM R3721 0 FE_TS_DATA[5]
FULL_NIM R3722 0 FE_TS_DATA[6]
FULL_NIM_CHINA R3723 0 FE_TS_DATA[7]
Close to the CI Slot
R3706 0 FULL_NIM_BR

+5V_TU
BOOSTER : CHINA OPT
L3701 BOOSTER_OPT BLM18PG121SN1D
R3734 BOOSTER_OPT 0
R3743 BOOSTER_OPT 10K
Q3701 ISA1530AC1 BOOSTER_OPT
R3737 2.2K
C3709 0.01uF 25V BOOSTER_OPT
Q3702 2SC3052 BOOSTER_OPT
R3745 BOOSTER_OPT 10K
FE_BOOSTER_CTL
LNA2_CTL
The pull-up/down of LNA2_CTL is depended on MODLE_OPT_1. GPIO must be added for FE_BOOSTER_CTL

TU_IIC_NON_ATSC_SANYO
R3740-*1 1K
+3.3V_TU
R3741-*1 1K
TU_IIC_ATSC_SANYO
R3740 1.2K
R3741 1.2K
TU_SCL
TU_SDA

TU_I2C_NON_FILTER
R3735 33
R3736 33
C3713 18pF 50V
C3711 18pF 50V
C3743 20pF 50V
C3742 20pF 50V
TU_I2C_FILTER

C3711-*1 20pF 50V TU_I2C_FILTER
C3713-*1 20pF 50V TU_I2C_FILTER
TU_I2C_FILTER R3735-*1 COIL
TU_I2C_FILTER R3736-*1 COIL

+5V_TU
R3755 470
R3758 0
TU_SIF
R3753 4.7K
Q3705 ISA1530AC1

+5V_TU
R3751 220
R3752 220
TU_CVBS
R3749 0
R3750 1K OPT
Q3703 ISA1530AC1

DEMOD_RESET
This was being applied to the only china demod, so this has to be deleted in both main and ISDB sheet.

+3.3V_TU
R3704 0 HALF_NIM
IF_AGC_MAIN
should be guarded by ground
R3742 4.7K FULL_NIM
R3744 4.7K FULL_NIM
DEMOD_SCL
DEMOD_SDA
C3712 22pF 50V FULL_NIM
C3714 22pF 50V FULL_NIM

HALF_NIM_1.2V_BCD
IC3703
AZ1117BH-ADJTRE1
+3.3V_TU
INPUT
ADJ/GND
OUTPUT
R2 HALF_NIM R3767 10
+1.2V/+1.8V_TU
HALF_NIM R3768 1.2K R1
IC3703-*1 AP1117EG-13
IN OUT ADJ/GND
HALF_NIM_1.2V_DIODES
R3703 150 OPT
HALF_NIM R3766 1 1/10W
C3740 0.1uF 16V HALF_NIM
C3741 10uF 10V HALF_NIM
Please, check multi Item! 10/12

IC3701
AP2132MP-2.5TRG1
+3.3V_TU
C3717 0.1uF 16V
R3771 10K FULL_NIM_BCD
R3770 10K FULL_NIM_BCD
R3769 10K FULL_NIM_BCD
PG EN VIN VCTRL GND ADJ VOUT NC
FULL_NIM_BCD THERM
FULL_NIM_BCD R3748*1 10K
FULL_NIM_SEMTEK R3748 5.1K R1
R3747 9.1K 1005 R2
Vo=0.8*(1+R1/R2)
+1.2V/+1.8V_TU 380mA
R3764 0 1/10W FULL_NIM
FULL_NIM C3729 0.1uF 16V
FULL_NIM C3730 10uF 10V
+5V_Normal
FULL_NIM_BCD L3704

IC3701-*1
SC4215ISTRT
NC_1 FULL_NIM_SEMTEK EN VIN NC_2 GND ADJ VO NC_3

TUNER MULTI-OPTION
TU3702-*1 TDVJ-H101F
TU3702-*3 UDA5SAL
TU3702-*2 TDTR-T036F
TU3702-*4 TDTJ-S101D
TU3701-*2 TDFR-B035F
TU3701-*4 TDFR-C236D

+5V_TUNER
+5V_TU
200mA
Size change L3702 MLB-201209-0120P-N2
C3719 22uF 10V
C3724 0.1uF 16V
C3722 22uF 16V
C3726 0.1uF 16V
location movement,0929
+3.3V_TU
60mA
Size change L3703 MLB-201209-0120P-N2
+3.3V_Normal
C3723 22uF 10V
C3725 0.1uF 16V
C3715 22uF 16V
C3727 0.1uF 16V
Add,0929

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LG ELECTRONICS

MODEL	GP2R	DATE	20101023
BLOCK	TUNER_L	SHEET	14

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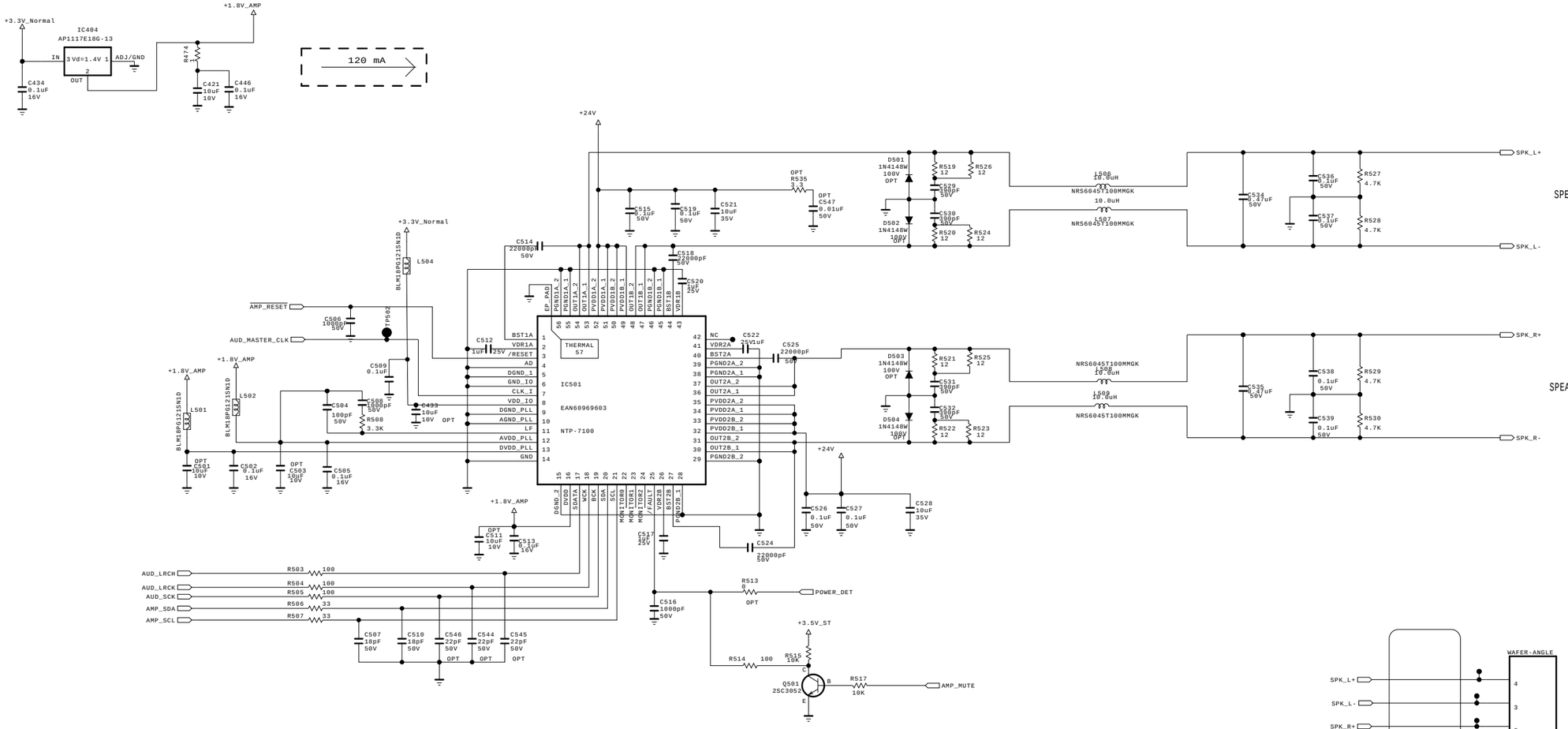

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MODEL	GP2R	DATE	20101023
BLOCK	AMP_NTP	SHEET	16 /

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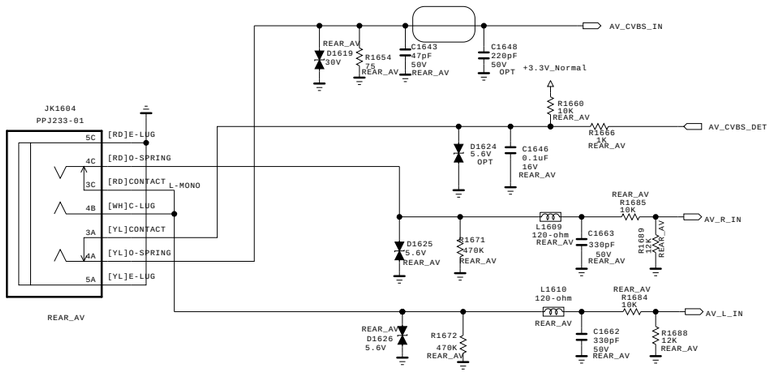
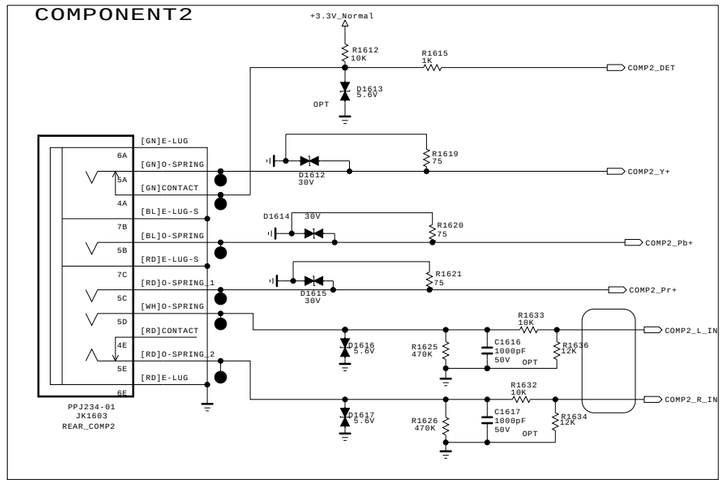
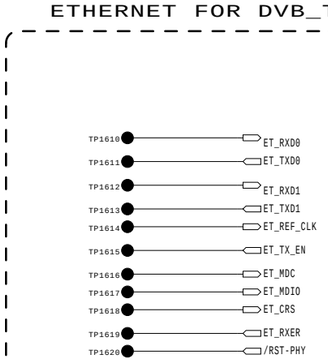
Rear AV

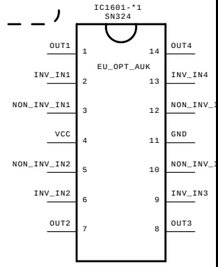


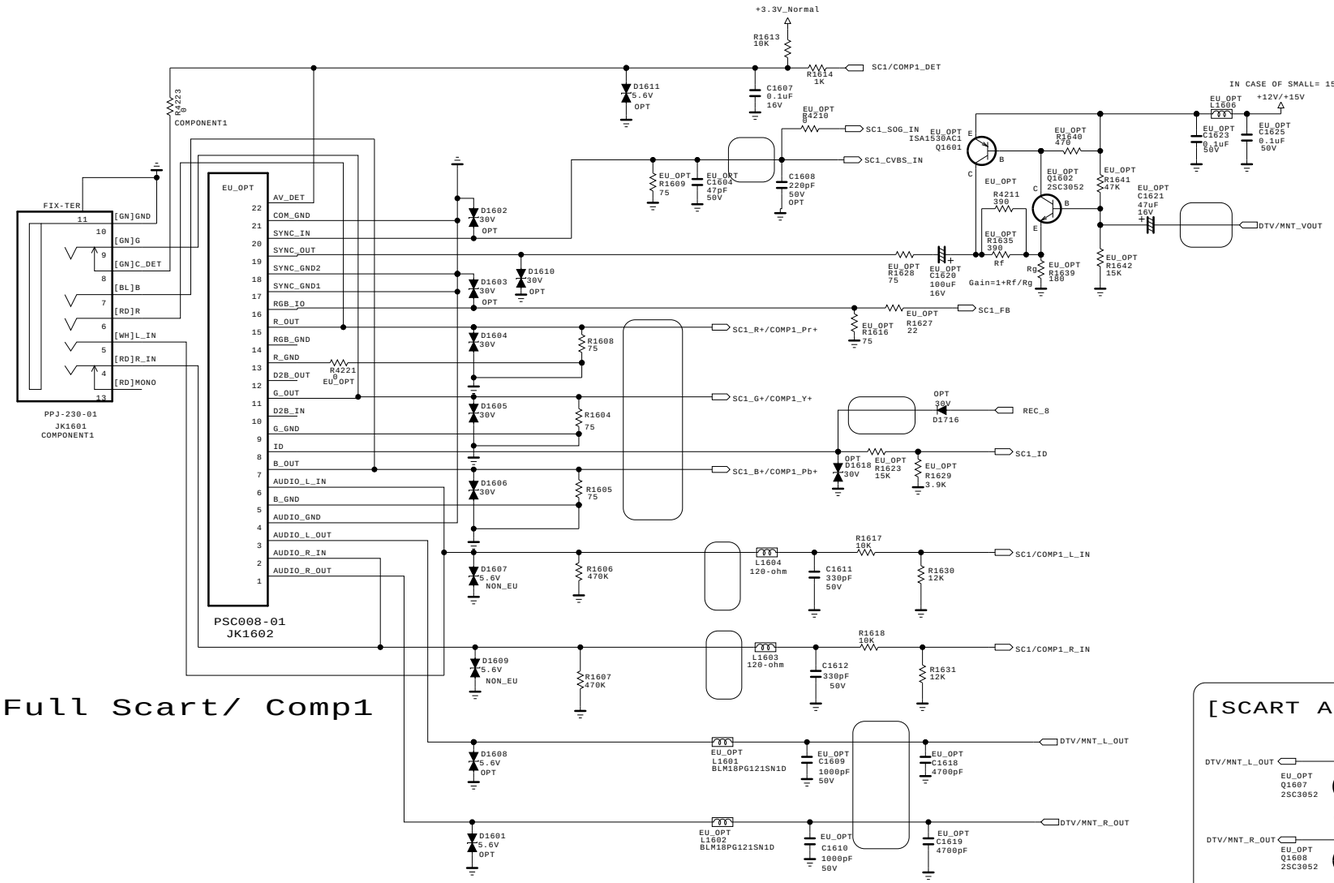
COMPONENT2



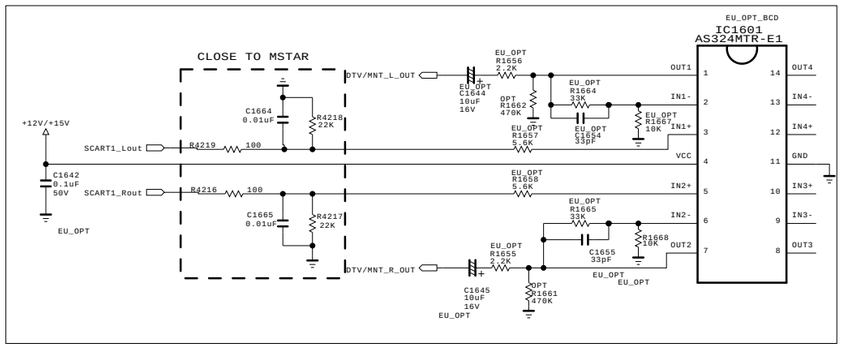
ETHERNET FOR DVB_T2

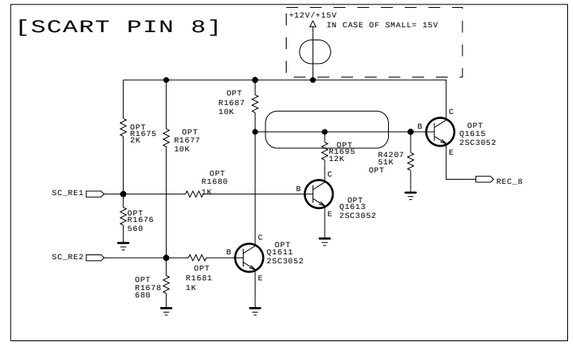


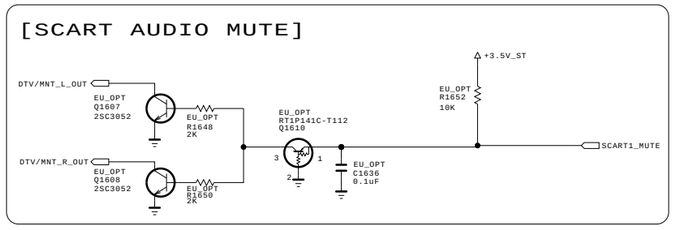




Full Scart/ Comp1







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MODEL	GP2R	DATE	20101023
BLOCK	REAR_JACK	SHEET	17

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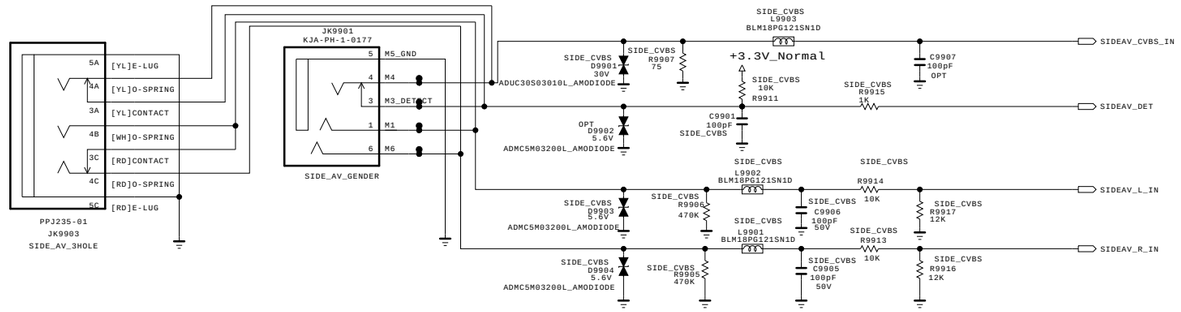
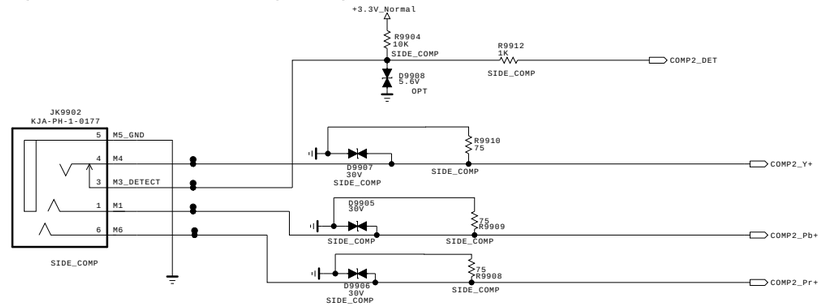
SIDE CVBS PHONE JACK
(New Item Development)



SIDE COMPONENT PHONE JACK
(New Item Developmen)



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MODEL	GP2R	DATE	20101023
BLOCK	SIDE_JACK	SHEET	18 /

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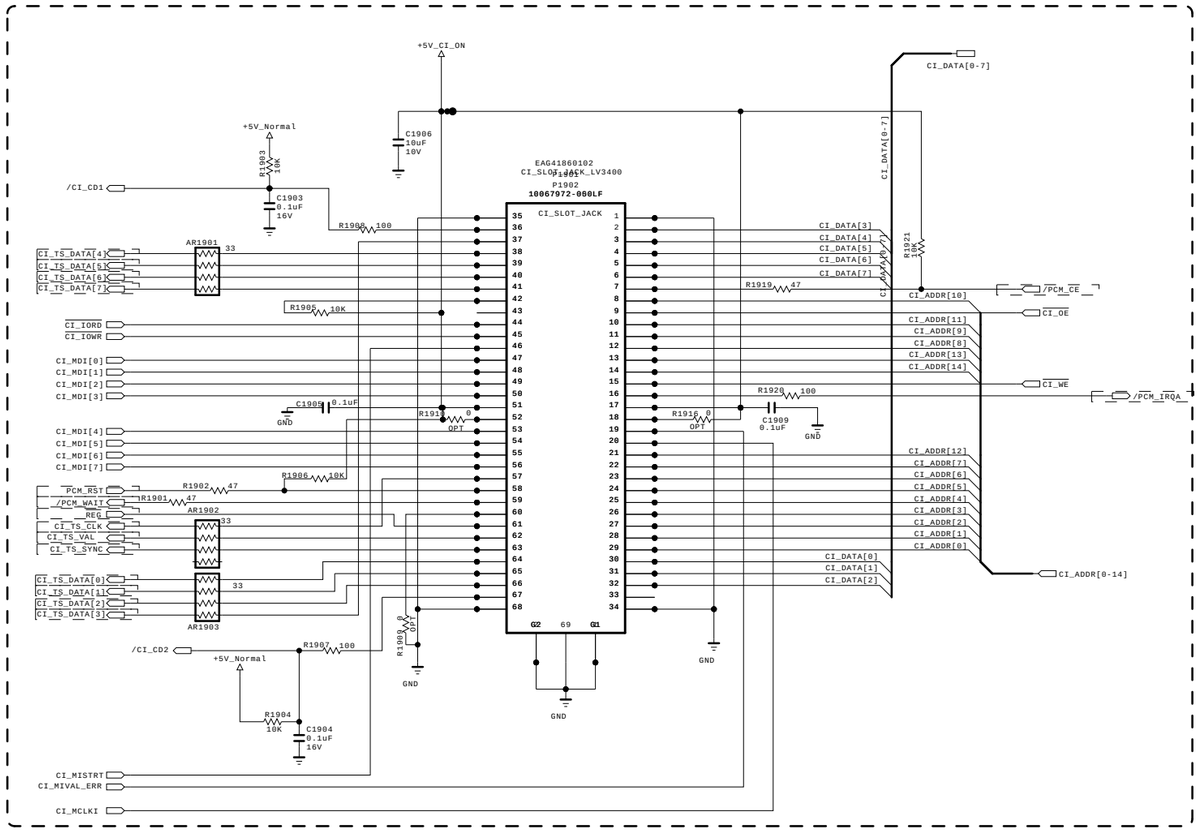
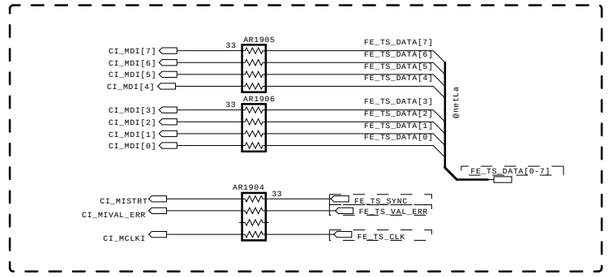
CI Region

* Option name of this page : CI_SLOT
(because of Hong Kong)

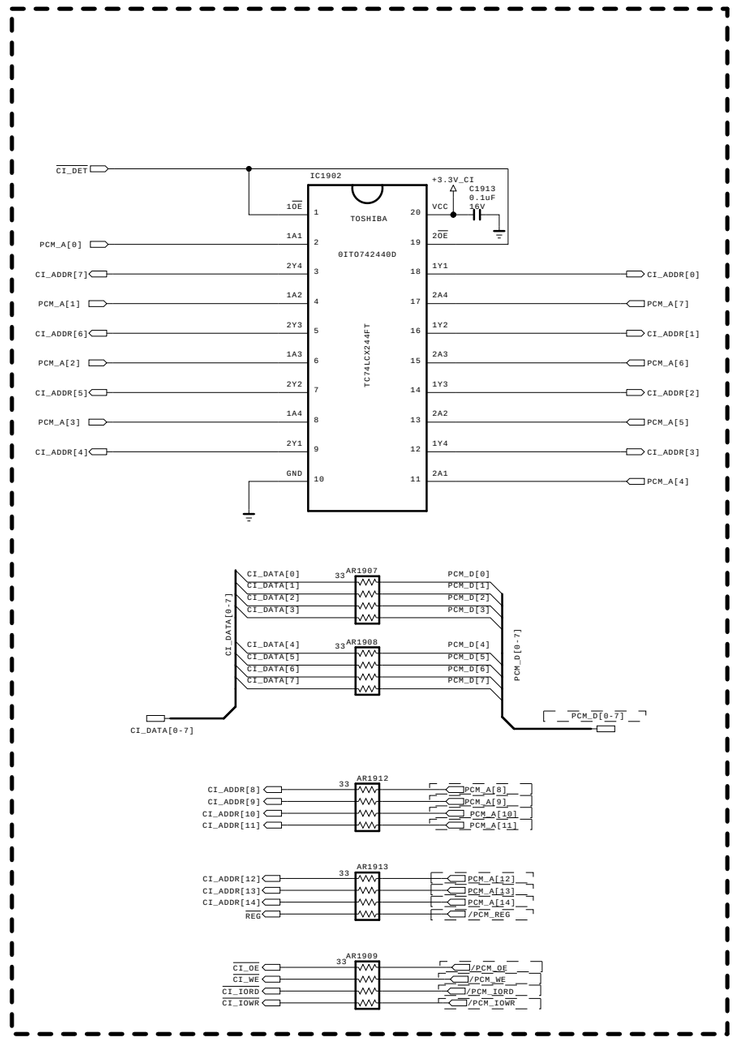
CI SLOT

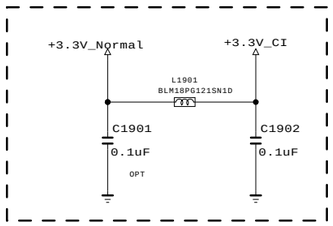


CI TS INPUT

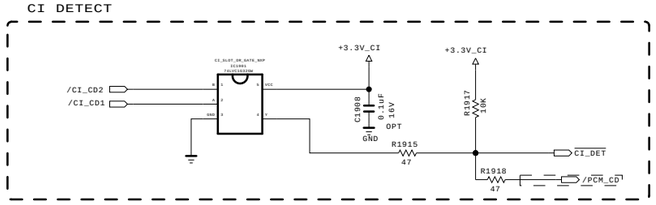


CI HOST I/F

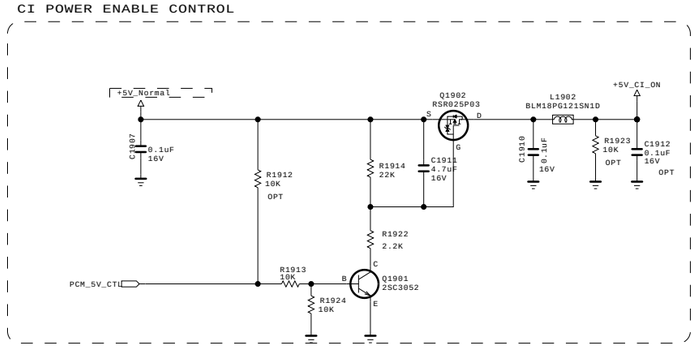




CI DETECT



CI POWER ENABLE CONTROL



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MODEL	GP2R	DATE	20101023
BLOCK	PCMCI	SHEET	20 /

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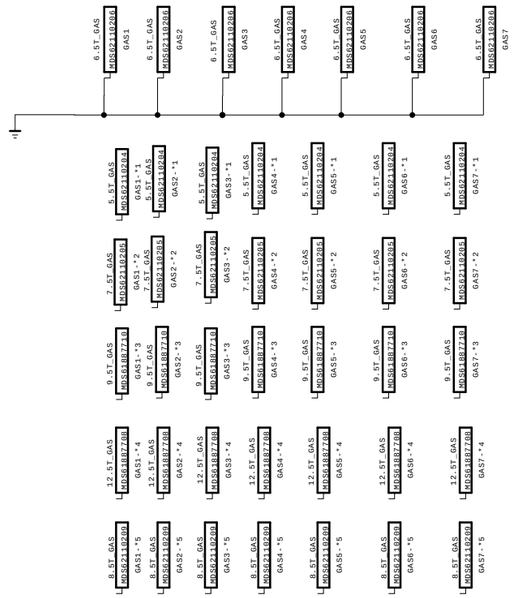
SMD GASKET



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MODEL	GP2R	DATE	20101023
BLOCK	SMD_GAS	SHEET	20 /

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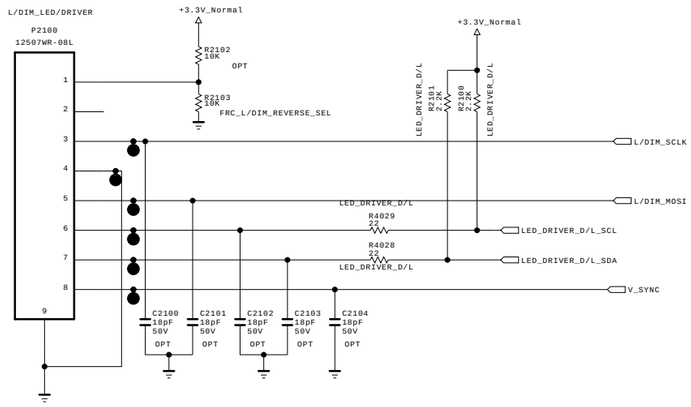

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BLOCK	L/DIM_LED	SHEET	21 /

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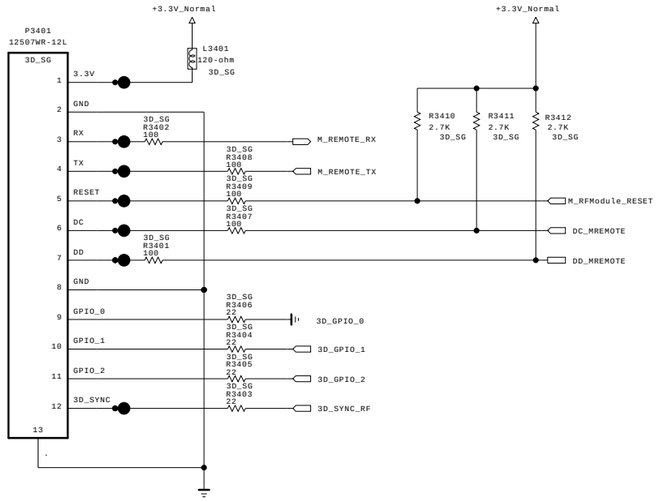
TI solution RF-3D OPTION



ALL 3D-SG OPTION

FREQ.	GPOIO_0	GPOIO_1	GPOIO_2
3D Off	0	0	0
60Hz	0	0	1
59.94Hz	0	1	0
50Hz	0	1	1
RESERVED	1	0	0
RESERVED	1	0	1
RESERVED	1	1	0
RESERVED	1	1	1

THE ⚠ SYMBOL MARK OF THIS SCHEMETIC DIAGRAM INCORPORATES SPECIAL FEATURES IMPORTANT FOR PROTECTION FROM X-RADIATION. FILRE AND ELECTRICAL SHOCK HAZARDS, WHEN SERVICING IF IS ESSENTIAL THAT ONLY MANUFATURES SPECFIED PARTS BE USED FOR THE CRITICAL COMPONENTS IN THE ⚠ SYMBOL MARK OF THE SCHEMETIC.

SECRET
LGElectronics

LG ELECTRONICS

MODEL		DATE	
BLOCK		SHEET	/

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LG
Life's Good

LCD TV Repair Guide
`11 years New Basic Models

Contents

1. Product Roadmap
2. Main PCB layout
3. Block Diagram
4. Interconnection
5. Standard Repair Process

LCD TV EU Group

LCD TV Research Department

JAN. 28th, 2011

LCD TV Repair Guide

`11 years New Models

< Applicable Basic Model >

xxLK330, xxLK430, xxLK450, xxLK530, xxLK550
xxLV2300, xxLV2500, xxLV2540, xxLV3400
xxLV3500, xxLV3550, xxLV5500, xxLV4500
xxLW4500 (3D)

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Product Roadmap

2011

Lamp

Tool	Pan EU	UK(U)	Nordic(N)	Italy(A)
LK33	22LK330-ZB	22LK330U-ZB	22LK330N-ZB	22LK330A-ZB
	26LK330-ZB	26LK330U-ZB	26LK330N-ZB	26LK330A-ZB
	32LK330-ZB	32LK330U-ZB	32LK330N-ZB	32LK330A-ZB
	22LK331-ZA			
	26LK331-ZA			
	32LK331-ZA			
LK43	32LK430-ZA	32LK430U-ZA	32LK430N-ZA	32LK430A-ZA
	37LK430-ZA	37LK430U-ZA	37LK430N-ZA	37LK430A-ZA
	42LK430-ZA	42LK430U-ZA	42LK430N-ZA	42LK430A-ZA
LK45	32LK450-ZB	32LK450U-ZB	32LK450N-ZB	32LK450A-ZB
	37LK450-ZB	37LK450U-ZB	37LK450N-ZB	37LK450A-ZB
	42LK450-ZB	42LK450U-ZB	42LK450N-ZB	42LK450A-ZB
	32LK451-ZA			
	37LK451-ZA			
	42LK451-ZA			
LK53	32LK530-ZC	32LK530U-ZC	32LK530N-ZC	32LK530A-ZC
	42LK530-ZC	42LK530U-ZC	42LK530N-ZC	42LK530A-ZC
	47LK530-ZC	47LK530U-ZC	47LK530N-ZC	47LK530A-ZC
LK55	32LK550-ZA	32LK550U-ZA	32LK550N-ZA	32LK550A-ZA
	42LK550-ZA	42LK550U-ZA	42LK550N-ZA	42LK550A-ZA
	32LK551-ZB			
	42LK551-ZB			

Edge LED

Tool	Pan EU	UK(U)	Nordic(N)	Italy(A)
LV23	19LV2300-ZA			
	22LV2300-ZA			
LV25	19LV2500-ZA	19LV250U-ZA	19LV250N-ZA	19LV250A-ZA
	22LV2500-ZA	22LV250U-ZA	22LV250N-ZA	22LV250A-ZA
	26LV2500-ZA	26LV250U-ZA	26LV250N-ZA	26LV250A-ZA
	32LV2500-ZA	32LV250U-ZA	32LV250N-ZA	32LV250A-ZA
	26LV2540-ZE	26LV254U-ZE	26LV254N-ZE	26LV254A-ZE
	32LV2540-ZE	32LV254U-ZE	32LV254N-ZE	32LV254A-ZE
LV34	32LV3400-ZA	32LV340U-ZA	32LV340N-ZA	32LV340A-ZA
	42LV3400-ZA	42LV340U-ZA	42LV340N-ZA	42LV340A-ZA
	32LW3450-ZB	32LW345U-ZB	32LW345N-ZB	32LW345A-ZB
	42LW3450-ZB	42LW345U-ZB	42LW345N-ZB	42LW345A-ZB
LV35	32LV3500-ZA	32LV350U-ZA	32LV350N-ZA	32LV350A-ZA
	37LV3500-ZA	37LV350U-ZA	37LV350N-ZA	37LV350A-ZA
	42LV3500-ZA	42LV350U-ZA	42LV350N-ZA	42LV350A-ZA
	47LV3500-ZA	47LV350U-ZA	47LV350N-ZA	47LV350A-ZA
	32LV3550-ZB	32LV355U-ZB	32LV355N-ZB	32LV355A-ZB
	37LV3550-ZB	37LV355U-ZB	37LV355N-ZB	37LV355A-ZB
	42LV3550-ZB	42LV355U-ZB	42LV355N-ZB	42LV355A-ZB
	47LV3550-ZB	47LV355U-ZB	47LV355N-ZB	47LV355A-ZB
	32LV3551-ZD			
	37LV3551-ZD			
	42LV3551-ZD			
	47LV3551-ZD			
LV45	32LV4500-ZC	32LV450U-ZC	32LV450N-ZC	32LV450A-ZC
	37LV4500-ZC	37LV450U-ZC	37LV450N-ZC	37LV450A-ZC
	42LV4500-ZC	42LV450U-ZC	42LV450N-ZC	42LV450A-ZC
	47LV4500-ZC	47LV450U-ZC	47LV450N-ZC	47LV450A-ZC
LW45 3D	32LW4500-ZB	32LW450U-ZB	32LW450N-ZB	32LW450A-ZB
	37LW4500-ZB	37LW450U-ZB	37LW450N-ZB	37LW450A-ZB
	42LW4500-ZB	42LW450U-ZB	42LW450N-ZB	42LW450A-ZB
	47LW4500-ZB	47LW450U-ZB	47LW450N-ZB	47LW450A-ZB
	55LW4500-ZB	55LW450U-ZB	55LW450N-ZB	55LW450A-ZB
LV55	22LV5500-ZC	22LV550U-ZC	22LV550N-ZC	22LV550A-ZC
	26LV5500-ZC	26LV550U-ZC	26LV550N-ZC	26LV550A-ZC

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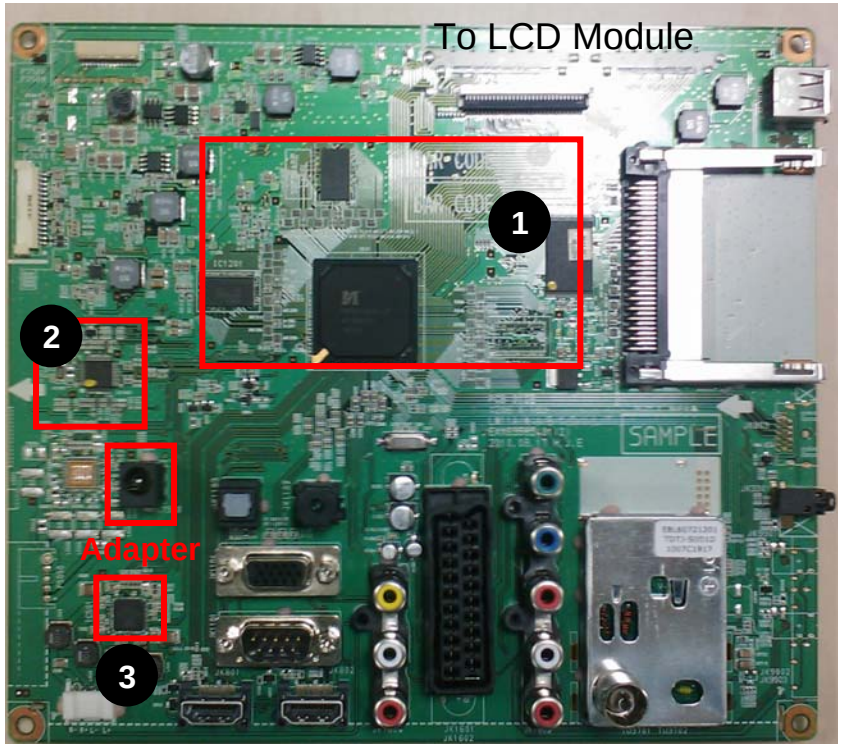
Main PCB

19/22/26LV2500 (50HZ)



1. Main processor, DDR Memory Flash Memory
2. Micom for Key/IR sensing
3. Audio AMP (5W+5W)

*** 19/22/26LV2500_S7 Reused ('11)**
Main IC : LGE101_Mstar
Tuner Type : TDTJ-S001D (DVB-T/C)
Display Type (Resolution) : LED TV (1366 x 768)
Interface : HDMI 2EA , Component 1EA, AV 1EA, USB 1EA
Difference : Without FRC, HDMI Position , Resolution , Interface, Wafer Position (Sub)

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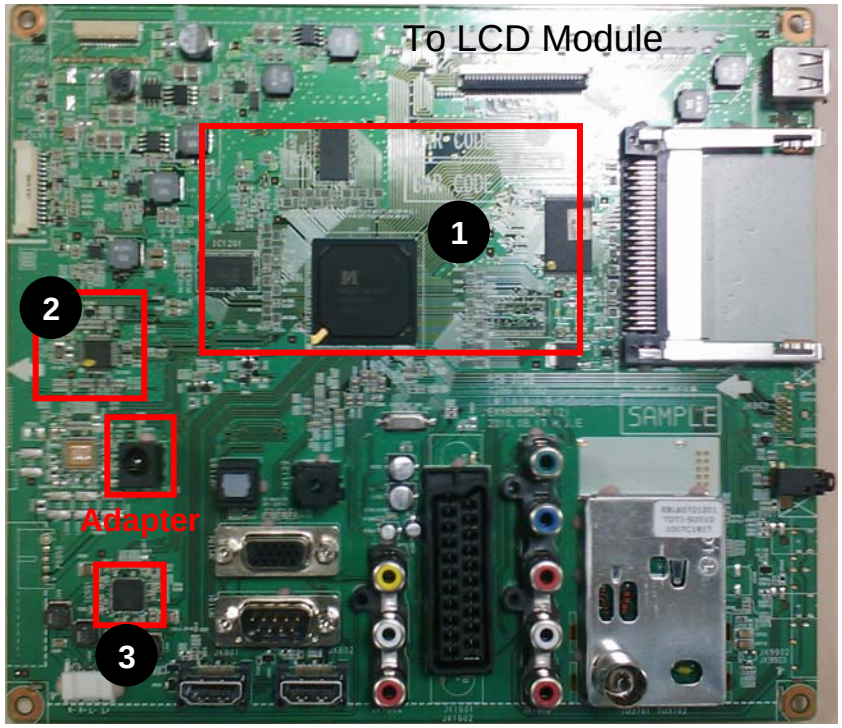
Main PCB

22/26LK330 (50HZ)



1. Main processor, DDR Memory Flash Memory
2. Micom for Key/IR sensing
3. Audio AMP (5W+5W)

* 22/26LK330_S7 Reused ('11)
Main IC : LGE101_Mstar
Tuner Type : TDTJ-S001D (DVB-T/C)
Display Type (Resolution) : LCD TV (1366 x 768)
Interface : HDMI 2EA , Component 1EA, AV 1EA, USB 1EA
Difference : Without FRC, HDMI Position , Resolution , Interface, Wafer Position (Sub)

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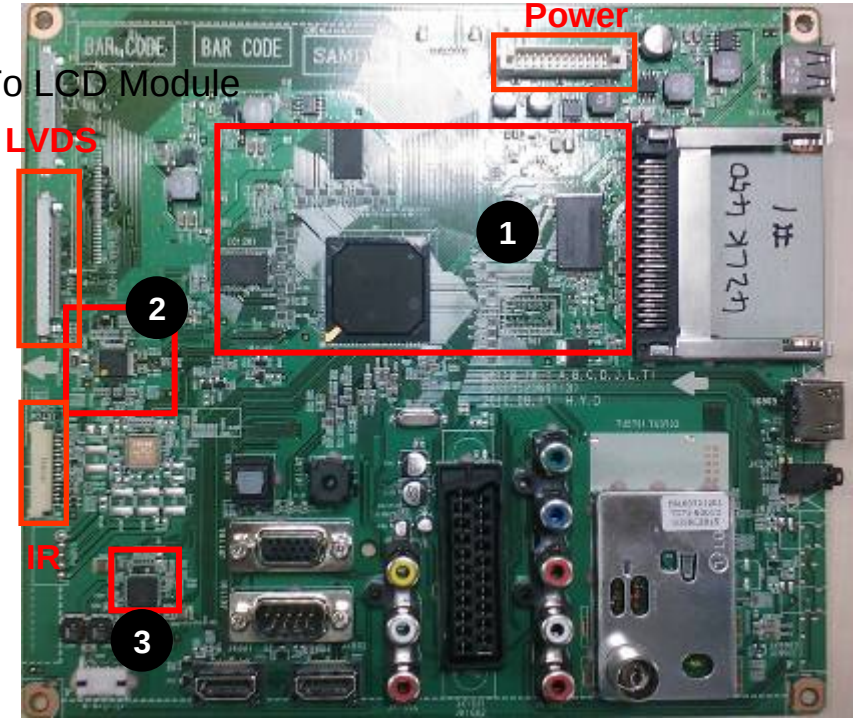
Main PCB

32/37/42/47LK450 (50HZ)



1. Main processor, DDR Memory Flash Memory
2. Micom for Key/IR sensing
3. Audio AMP (10W+10W)

*** 32/37/42/47LK450_S7 Reused ('11)**
Main IC : LGE101_Mstar
Tuner Type : TDTJ-S001D (DVB-T/C)
Display Type (Resolution) : LCD TV (1920 x 1080)
Interface : HDMI 3EA , Component 1EA, AV 1EA, USB 1EA
Difference : Without FRC, HDMI Position , Resolution , Interface, Wafer Position (Sub)

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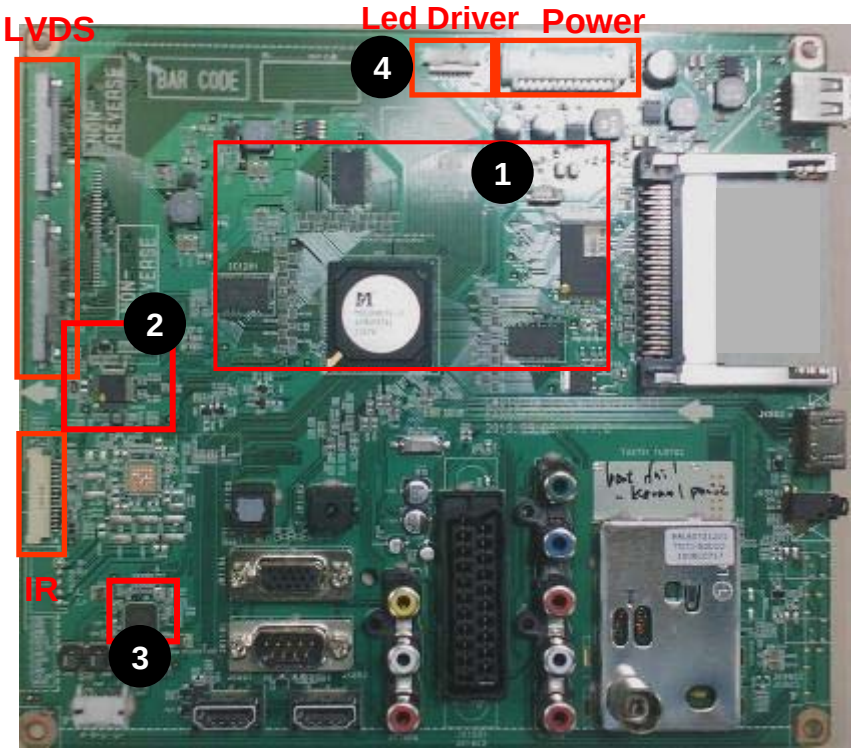
Main PCB

32/37/42/47/55LW4500 (100HZ)



1. Main processor, DDR Memory
   Flash Memory
2. Micom for Key/IR sensing
3. Audio AMP (10W+10W)
4. LED Driver connection (with local dimming)

*** 37LW4500_S7 Reused ('11)**
Main IC : LGE107_Mstar
Tuner Type : TDTJ-S001D (DVB-T/C)
Display Type (Resolution) : 3D, LED TV (1920 x 1080)
Interface : HDMI 3EA , Component 1EA, AV 1EA, USB 1EA
Difference : HDMI Position , Interface, Wafer Position (LVDS, Power, Sub)

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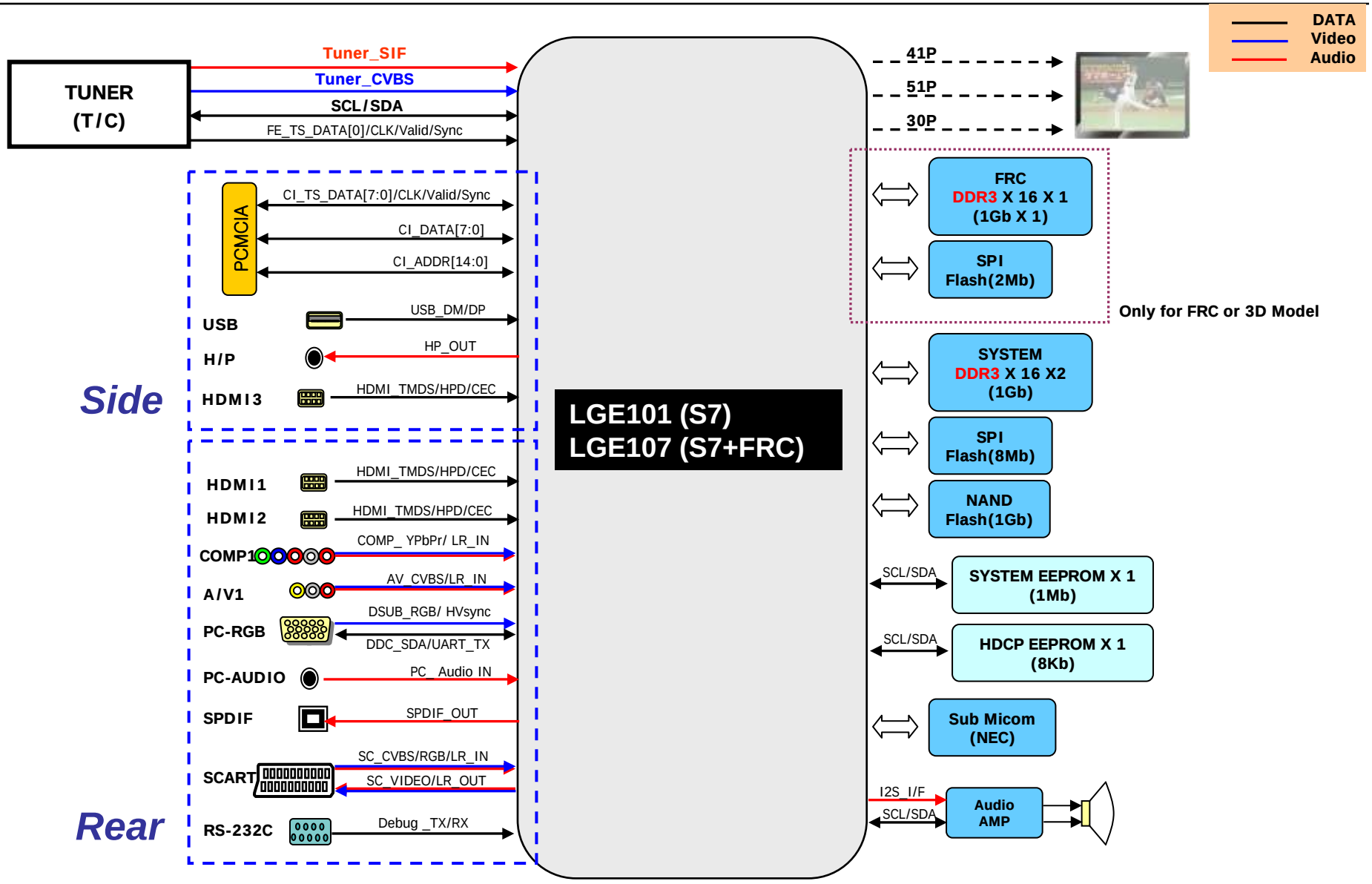
Block diagram



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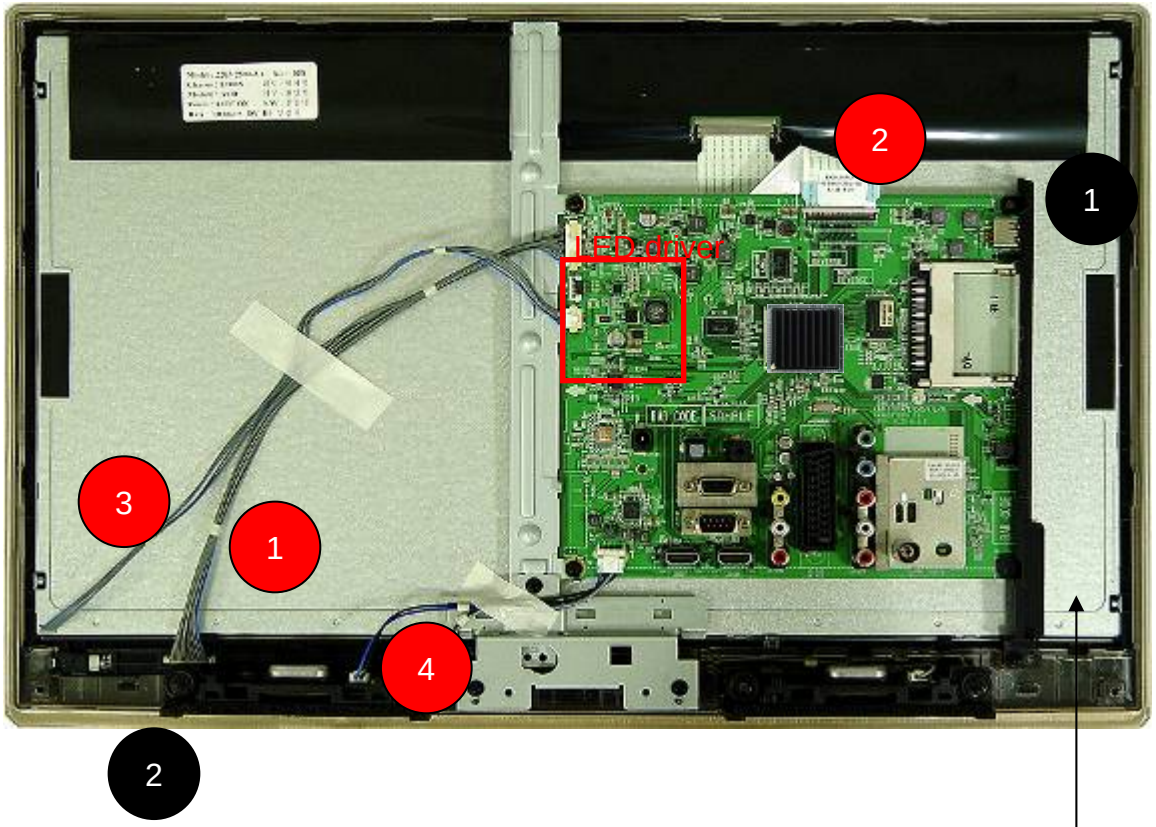
Interconnection - 1

19/22LV2500



[PCBs]

1. Main PCB
2. Soft Touch Key/IR PCB

[Cables]

1. Soft Touch key/IR cable
2. Main / Module LVDS cable
3. LED driver / Module cable
4. SPK cable

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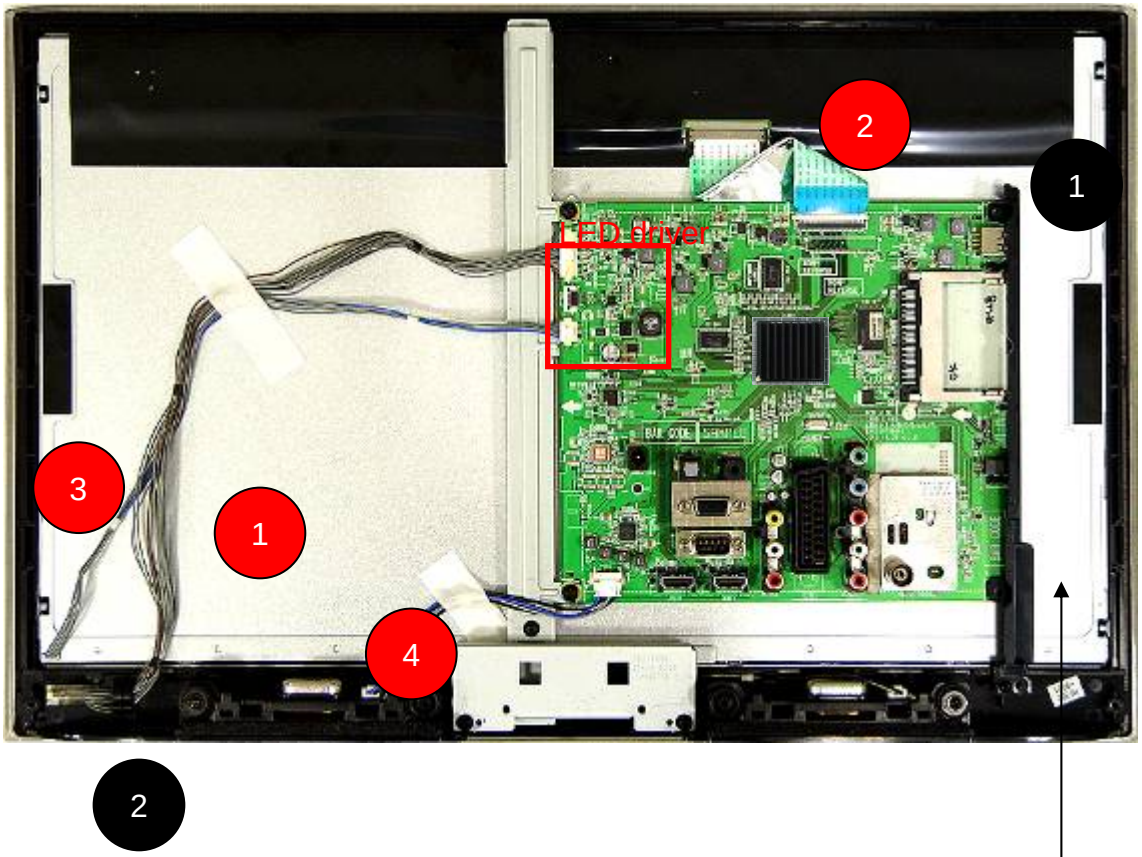
Interconnection - 2

19/22LV5500



[PCBs]

1. Main PCB
2. Soft Touch Key/IR PCB

[Cables]

1. Soft Touch key/IR cable
2. Main / Module LVDS cable
3. LED driver / Module cable
4. SPK cable

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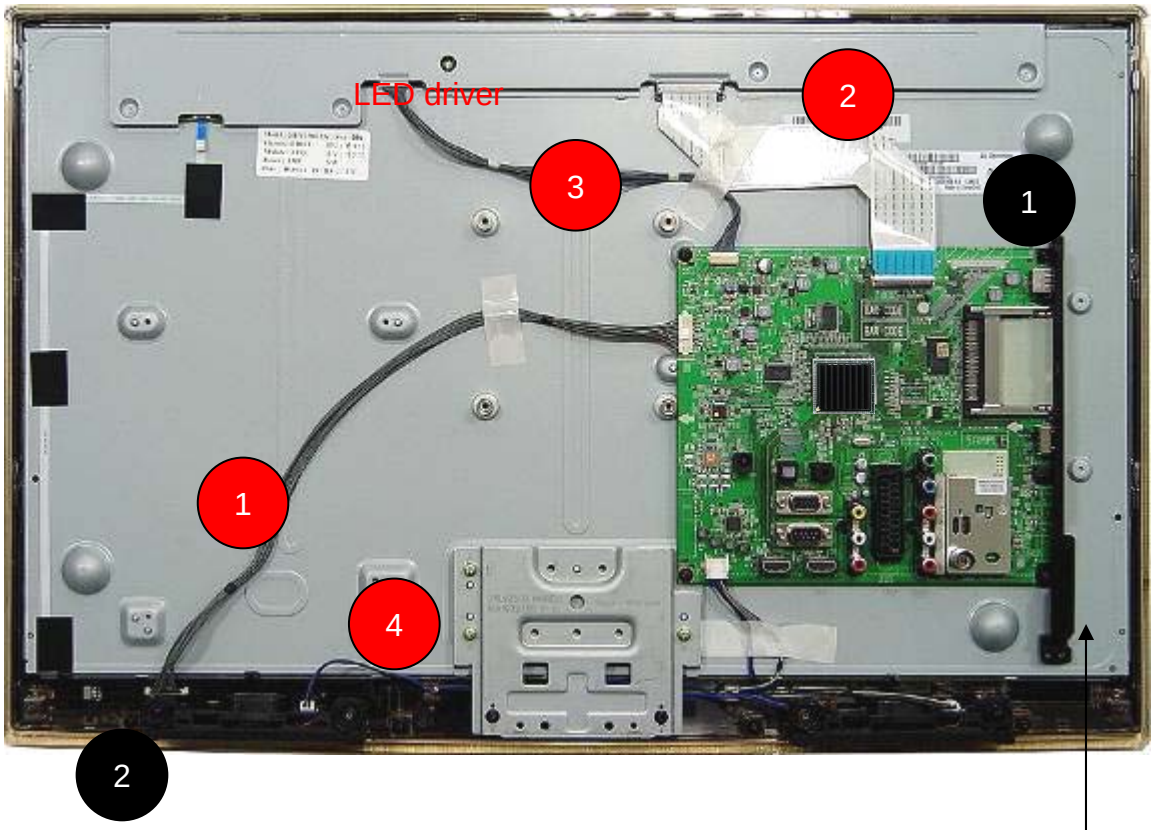
Interconnection - 3

26LV2500



[PCBs]

1. **Main PCB**
2. **Soft Touch Key/IR PCB**

[Cables]

1. **Soft Touch key/IR cable**
2. **Main / Module LVDS cable**
3. **LED driver / Module cable**
4. **SPK cable**

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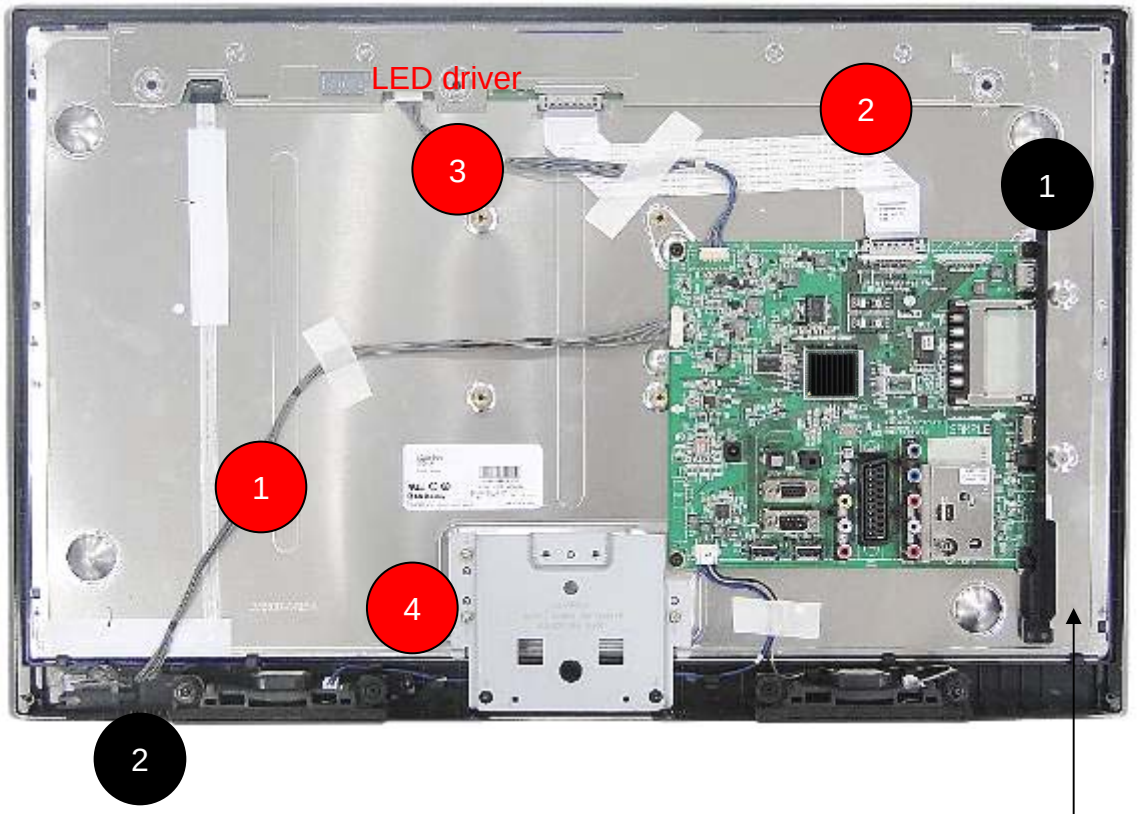
Interconnection - 4

26LV5500



[PCBs]

1. Main PCB
2. Soft Touch Key/IR PCB

[Cables]

1. Soft Touch key/IR cable
2. Main / Module LVDS cable
3. LED driver / Module cable
4. SPK cable

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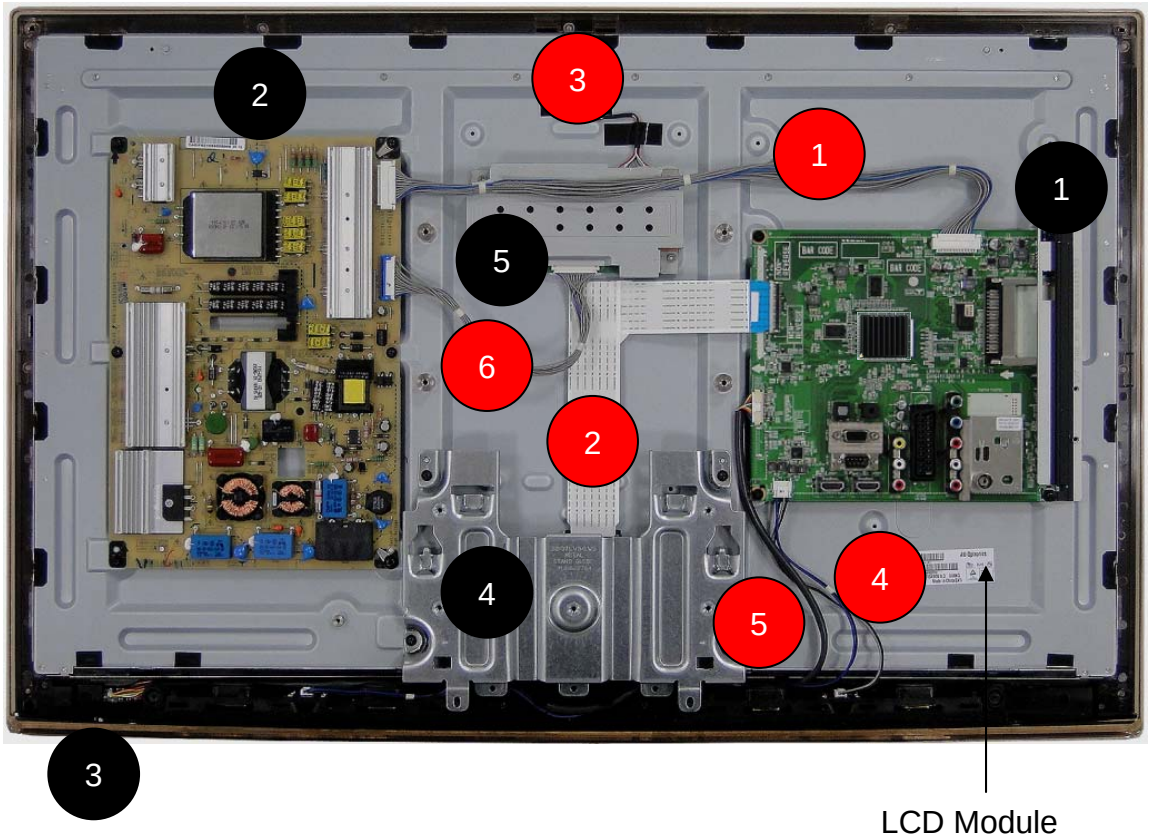
Interconnection - 5

32LV2500



[PCBs]

1. Main PCB
2. PSU
3. Soft Touch Key/IR PCB
4. Timing controller
5. LED Driver

[Cables]

1. Main / PSU cable
2. Main / Module LVDS cable
3. LED driver / Module cable
4. SPK cable
5. Soft Touch key/IR cable
6. LED driver / PSU cable 14P

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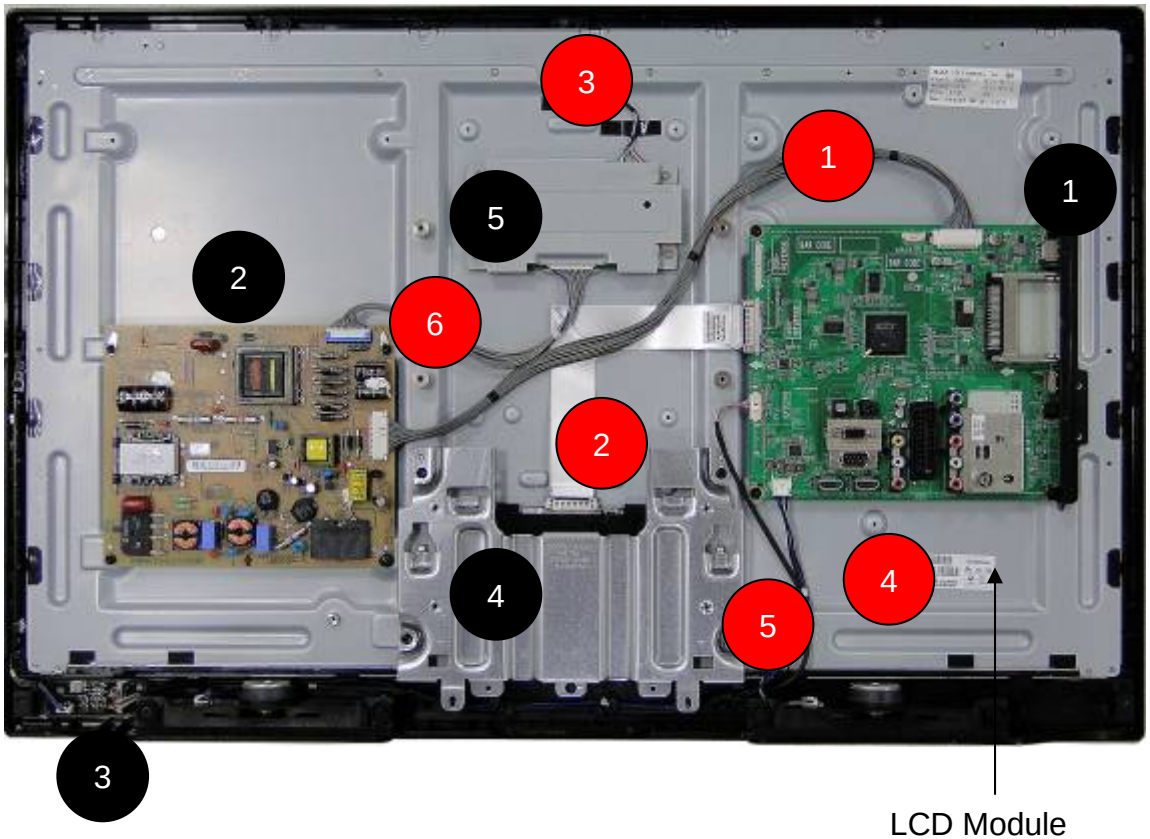
Interconnection - 6

37LV3400



[PCBs]

1. Main PCB
2. PSU
3. Soft Touch Key/IR PCB
4. Timing controller
5. LED Driver

[Cables]

1. Main / PSU cable
2. Main / Module LVDS cable
3. LED driver / Module cable
4. SPK cable
5. Soft Touch key/IR cable
6. LED driver / PSU cable 14P

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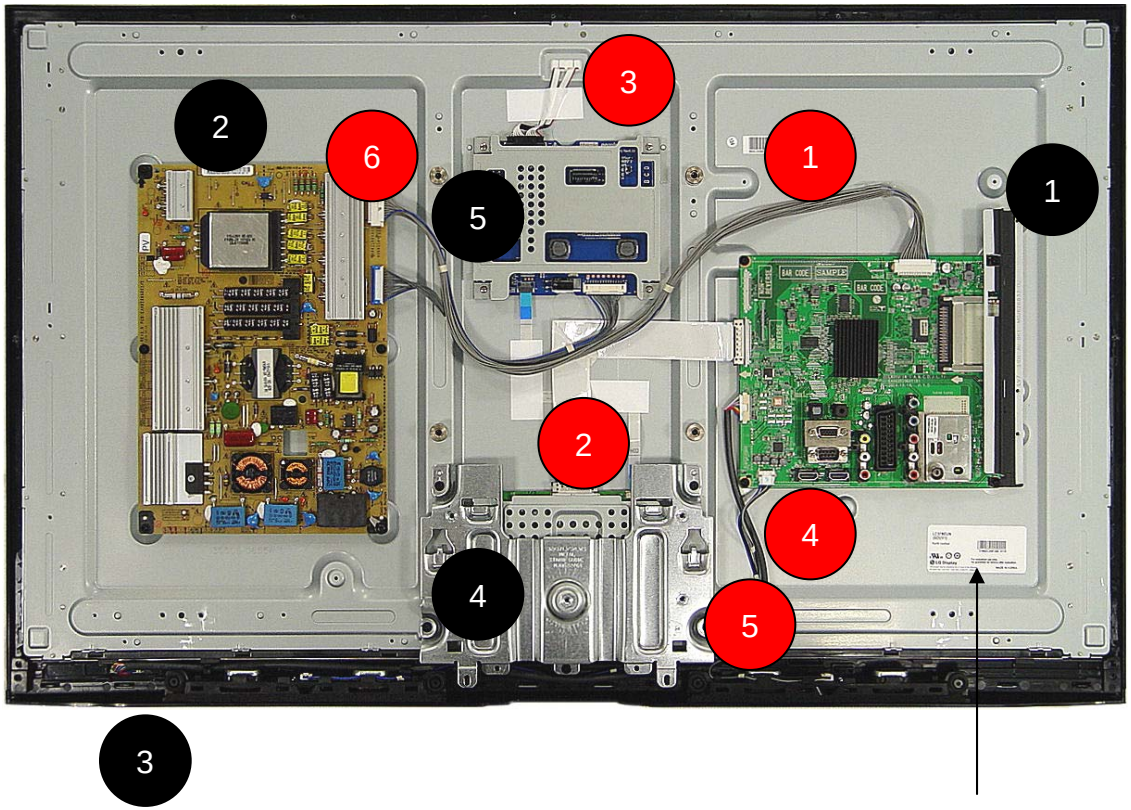
Interconnection - 7

37LV3550



[PCBs]

1. Main PCB
2. PSU
3. Soft Touch Key/IR PCB
4. Timing controller
5. LED Driver

[Cables]

1. Main / PSU cable
2. Main / Module LVDS cable
3. LED driver / Module cable
4. SPK cable
5. Soft Touch key/IR cable
6. LED driver / PSU cable 14P

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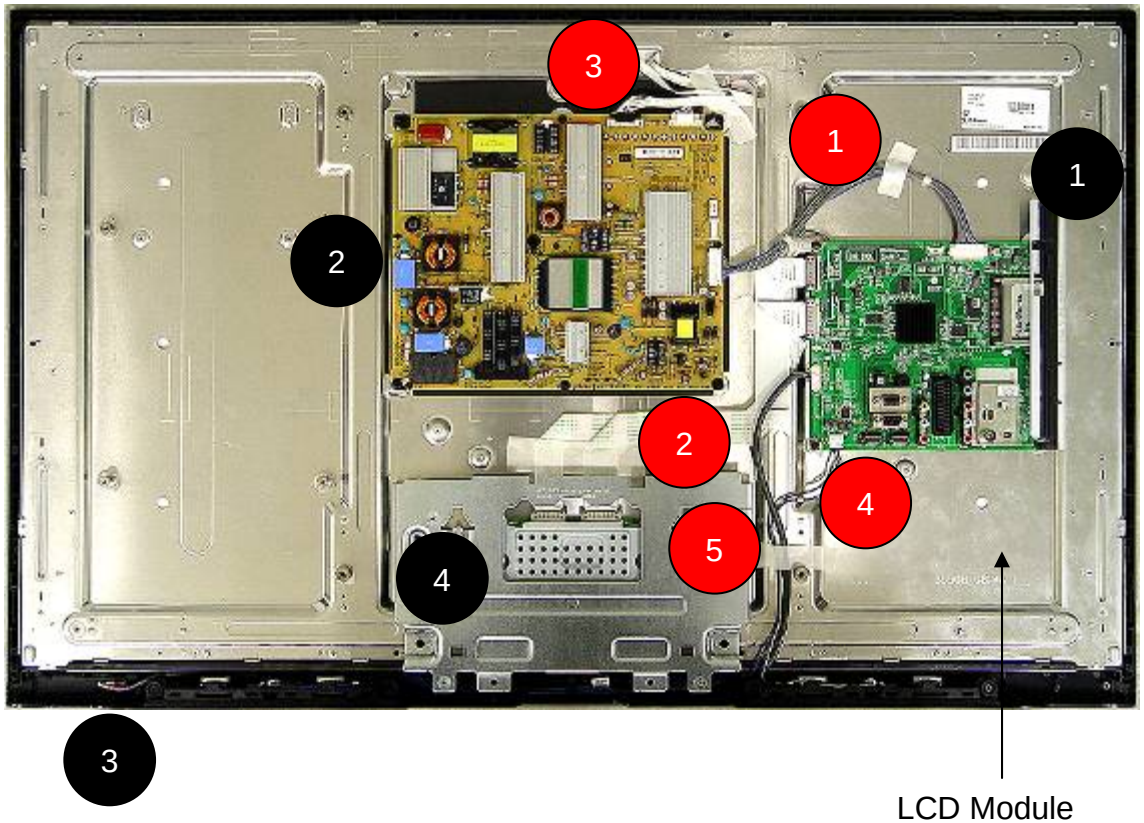
Interconnection - 8

42LV4500



[PCBs]

1. Main PCB
2. PSU + LED driver
3. Soft Touch Key/IR PCB
4. Timing controller

[Cables]

1. Main / PSU cable
2. Main / Module LVDS cable
3. LED driver / Module cable
4. SPK cable
5. Soft Touch key/IR cable

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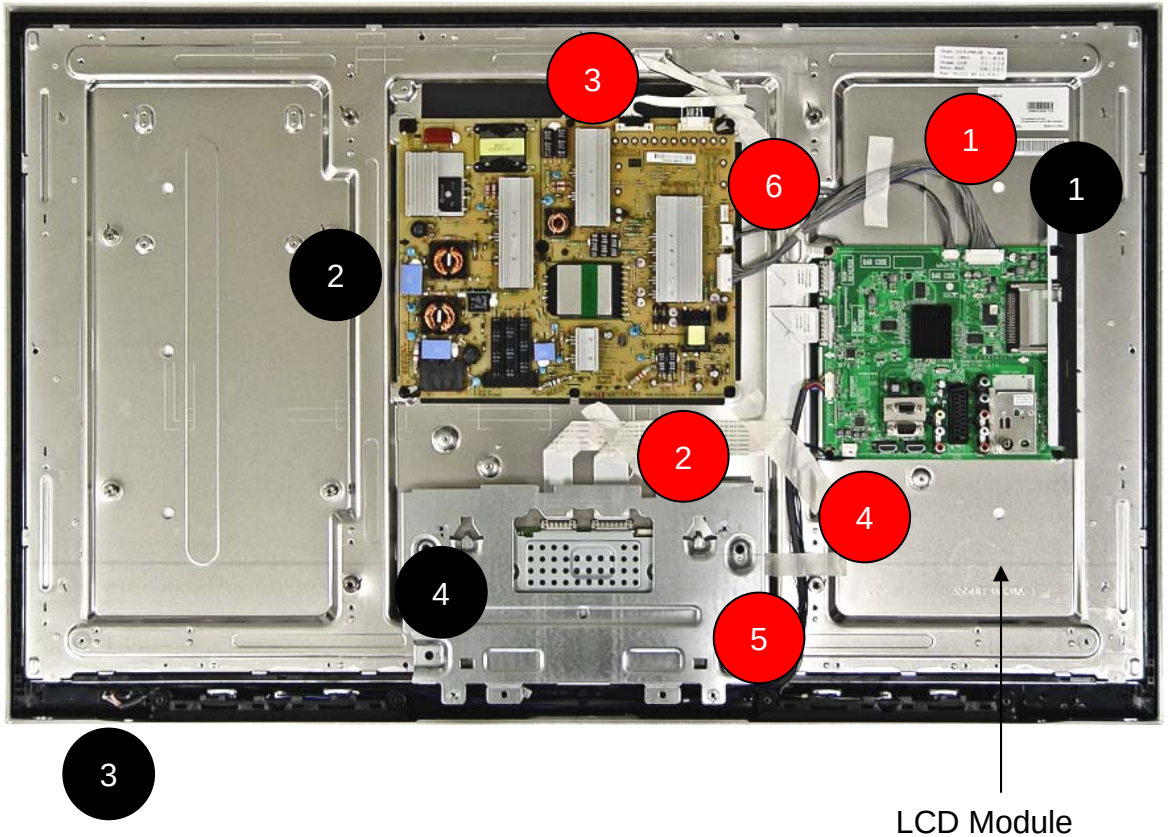
Interconnection - 9

42LW4500



[PCBs]

1. Main PCB
2. PSU + LED driver
3. Soft Touch Key/IR PCB
4. Timing controller

[Cables]

1. Main / PSU cable
2. Main / Module LVDS cable
3. LED driver / Module cable
4. SPK cable
5. Soft Touch key/IR cable
6. Local dimming signal cable (Main / LED driver 8pin)

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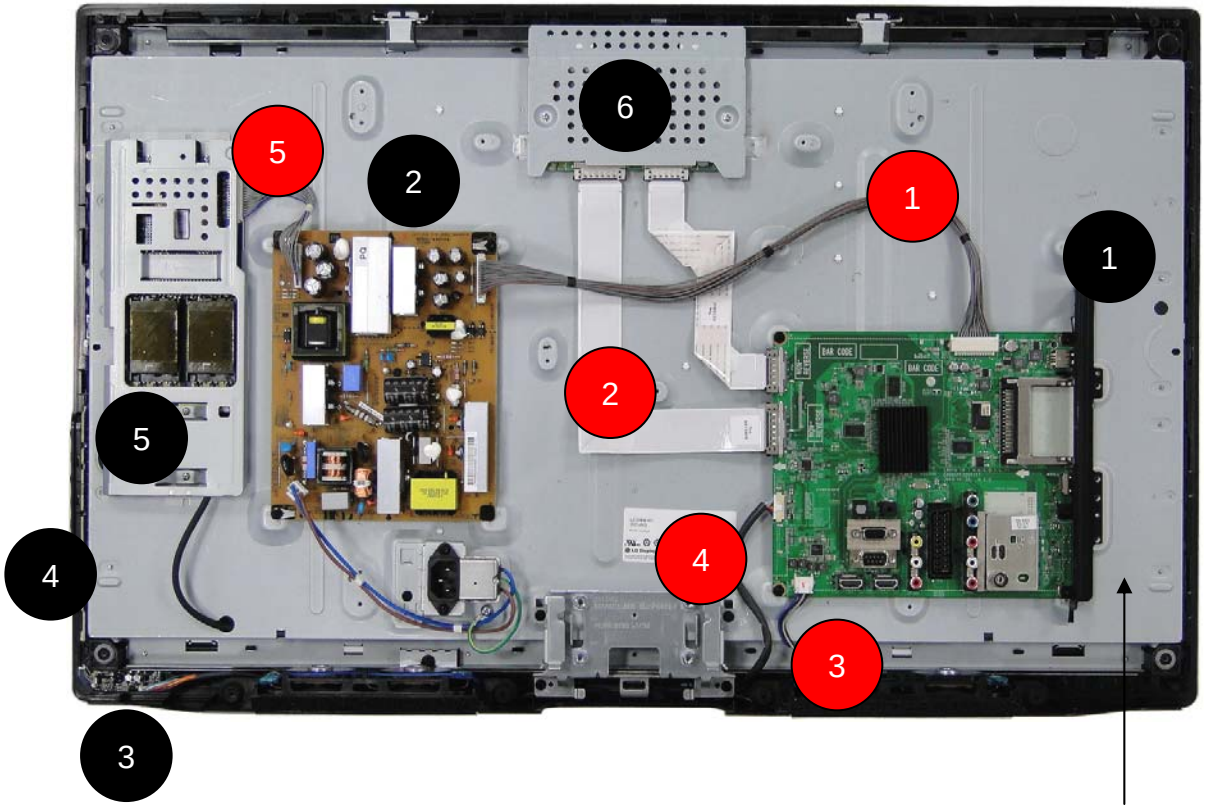
Interconnection - 10

32LK530



[PCBs]

1. Main PCB
2. PSU (without inverter)
3. IR & Indicator PCB
4. Local Key PCB
5. Inverter
6. Timing controller

[Cables]

1. Main / PSU cable
2. Main / Module LVDS cable
3. SPK cable
4. IR/Local key cable
5. Inverter/PSU cable (14pin)

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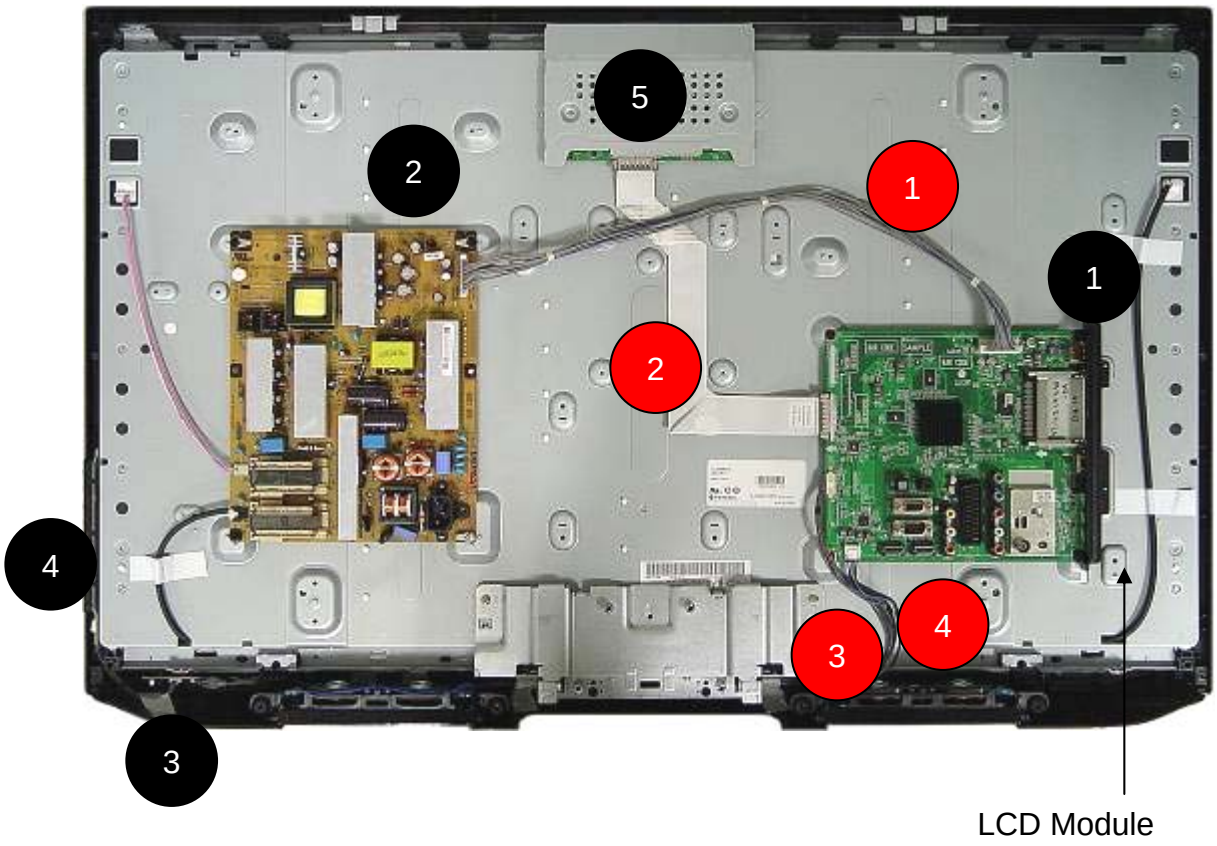
Interconnection - 11

37LK430



[PCBs]

1. Main PCB
2. PSU (without inverter)
3. IR & Indicator PCB
4. Local Key PCB
5. Timing controller

[Cables]

1. Main / PSU cable
2. Main / Module LVDS cable
3. SPK cable
4. IR/Local key cable

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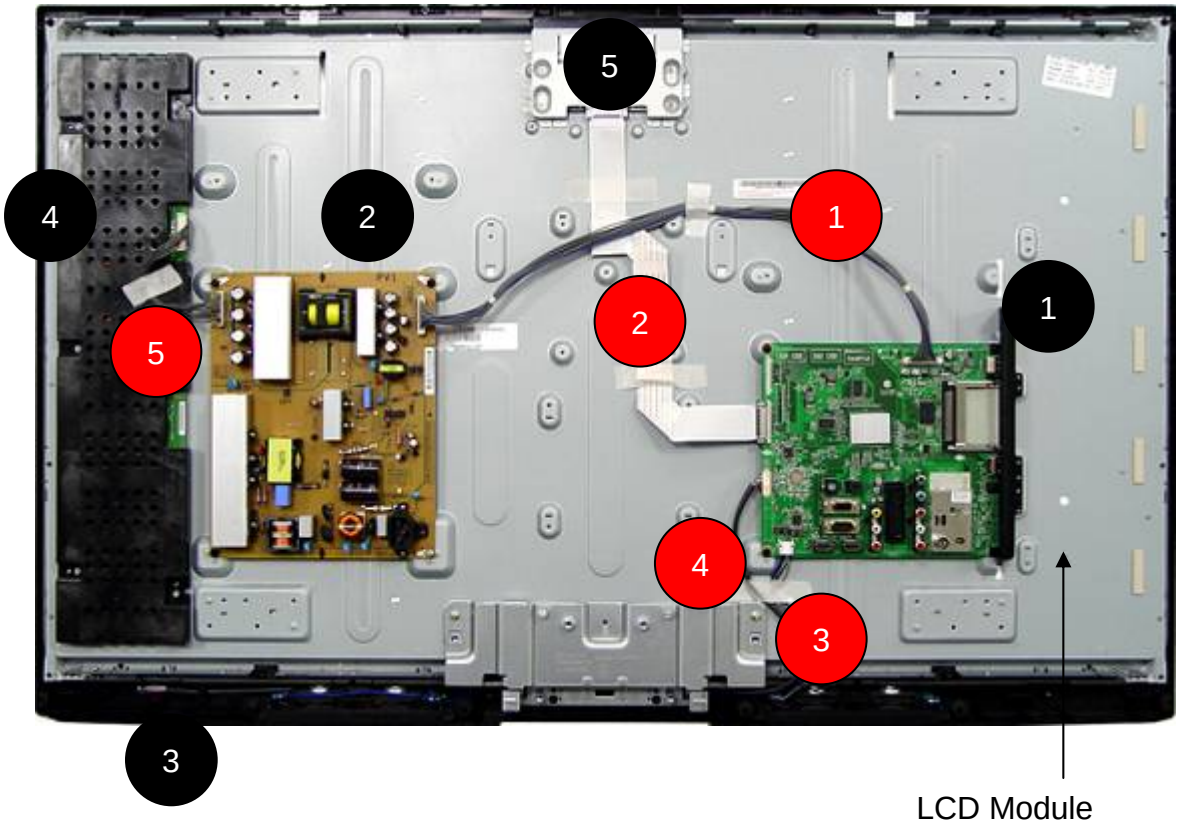
Interconnection - 12

42LK450



[PCBs]

1. **Main PCB**
2. **PSU (without inverter)**
3. **Soft Touch Key/IR PCB**
4. **Inverter**
5. **Timing controller**

[Cables]

1. **Main / PSU cable**
2. **Main / Module LVDS cable**
3. **SPK cable**
4. **Soft Touch key/IR cable**
5. **Inverter/PSU cable (14pin)**

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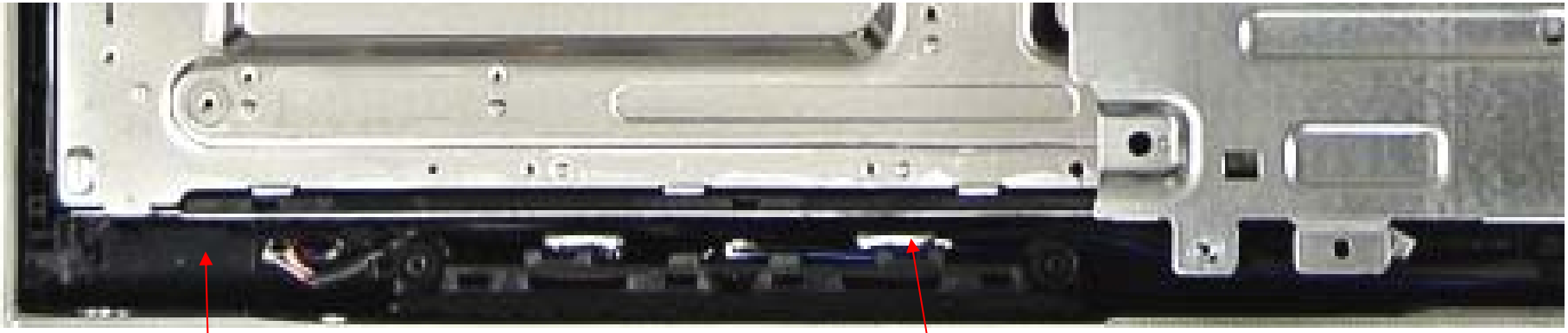
Interconnection – sub PCB(LV**/LK450 Series)



SPK unit

Soft Touch Key/IR PCB

15pin Cable

To Main

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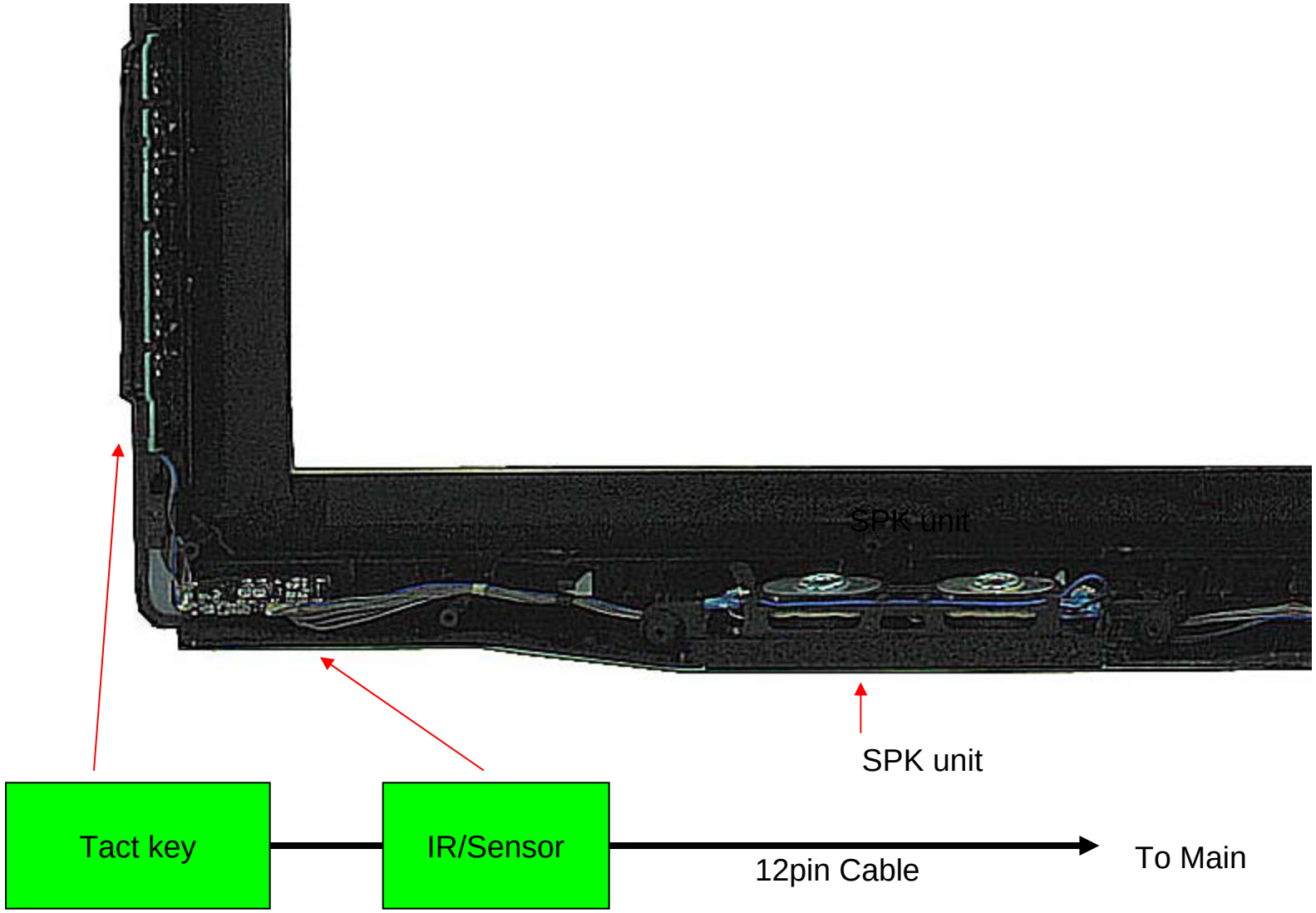
Interconnection – sub PCB(LK430/LK530 Series)



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Contents of LCD TV Standard Repair Process

No.	Error symptom (High category)	Error symptom (Mid category)	Page	Remarks
1	A. Video error	No video/Normal audio	1	
2		No video/No audio	2	
3		Video error, video lag/stop	3	
4		Color error	4	
5		Vertical/Horizontal bar, residual image, light spot, external device color error	5	
6	B. Power error	No power	6	
7		Off when on, off while viewing, power auto on/off	7	
8	C. Audio error	No audio/Normal video	8	
9		Wrecked audio/discontinuation/noise	9	
10	D. Function error	No response in remote controller, key error, recording error, memory error	10	
11		External device recognition error	11	
12	E. Noise	Circuit noise, mechanical noise	12	
13	F. Exterior error	Exterior defect	13	

First of all, Check whether there is SVC Bulletin in GCSC System for these model.

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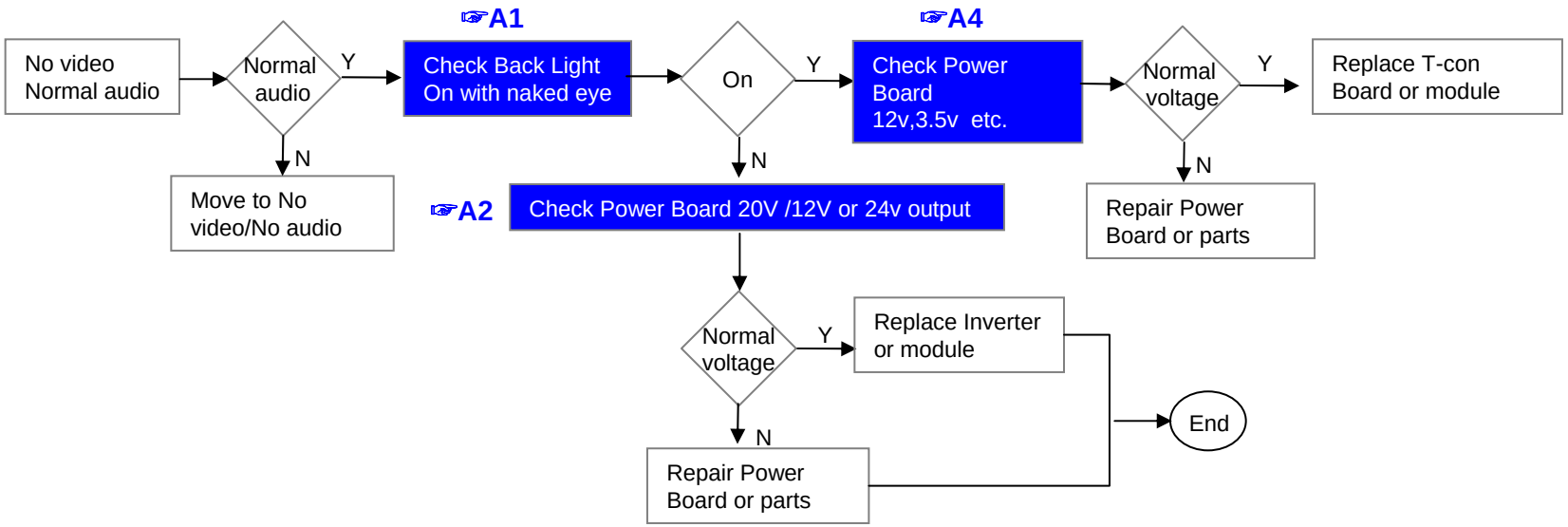
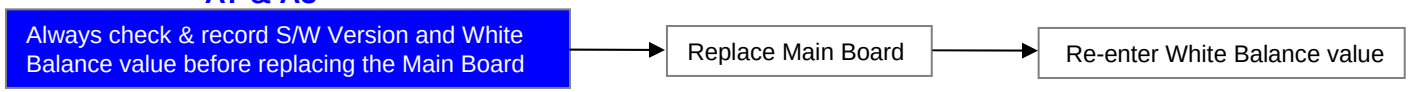
LCD TV	Error symptom	A. Video error	Established date	2010. 2 .19	
		No video/ Normal audio	Revised date		1/13

First of all, Check whether all of cables between board is inserted properly or not.
(Main B/D↔ Power B/D, LVDS Cable,Speaker Cable,IR B/D Cable,,,)



※Precaution ☞A7 & A3


Always check & record S/W Version and White Balance value before replacing the Main Board
Replace Main Board
Re-enter White Balance value

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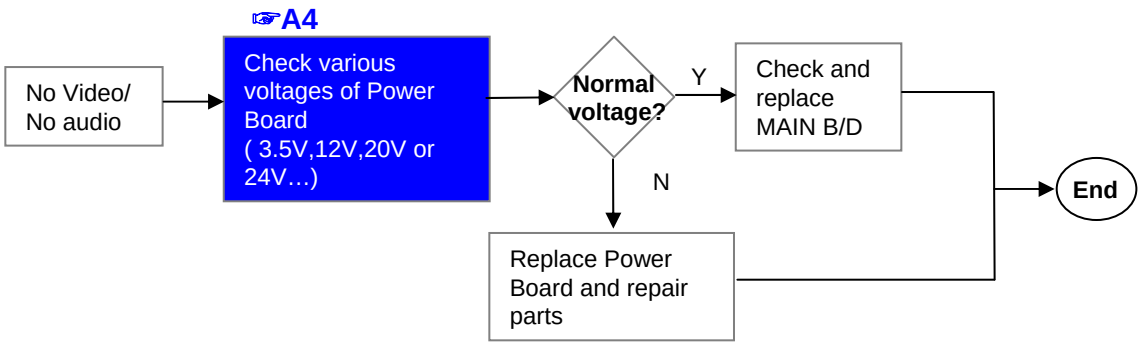
LGE Internal Use Only

LCD TV	Error symptom	A. Video error	Established date	2010. 2 .19	
		No video/ No audio	Revised date		2/13



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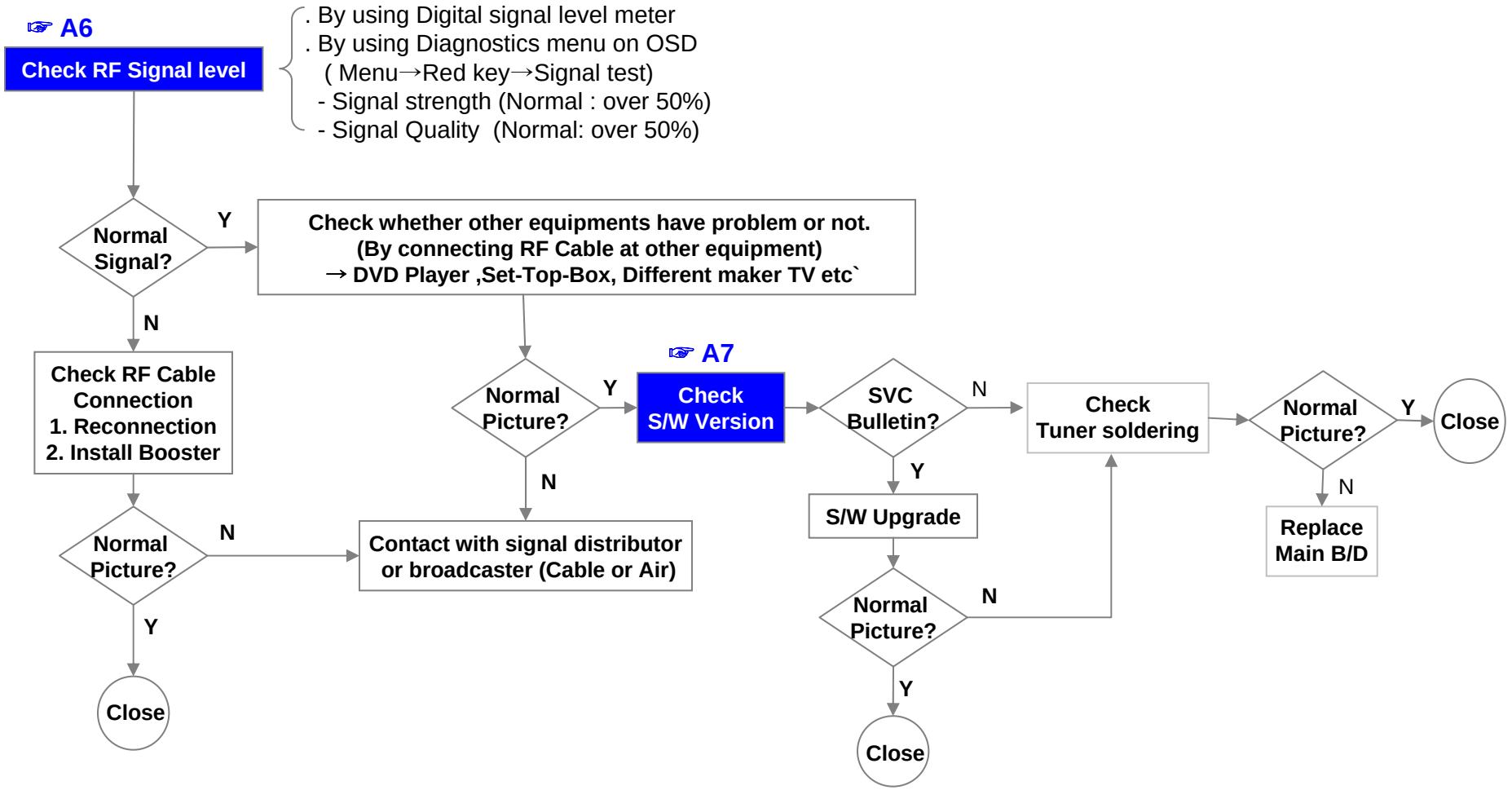
LCD TV	Error symptom	A. Picture Problem	Established date	2010. 2 .19	
		Picture broken/ Freezing	Revised date		3/13



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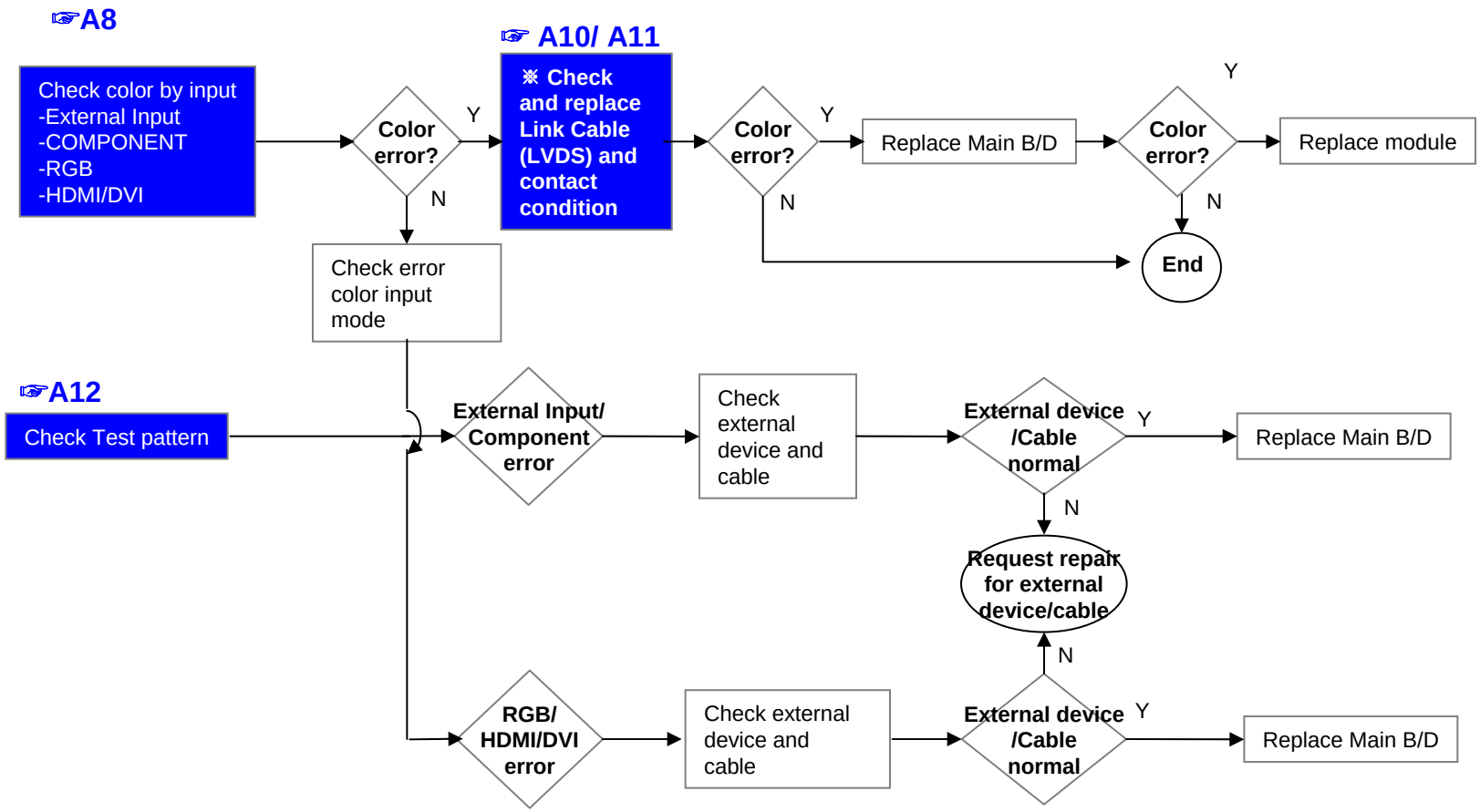
LCD TV	Error symptom	A. Video error	Established date	2010. 2 .19	
		Color error	Revised date		4/13



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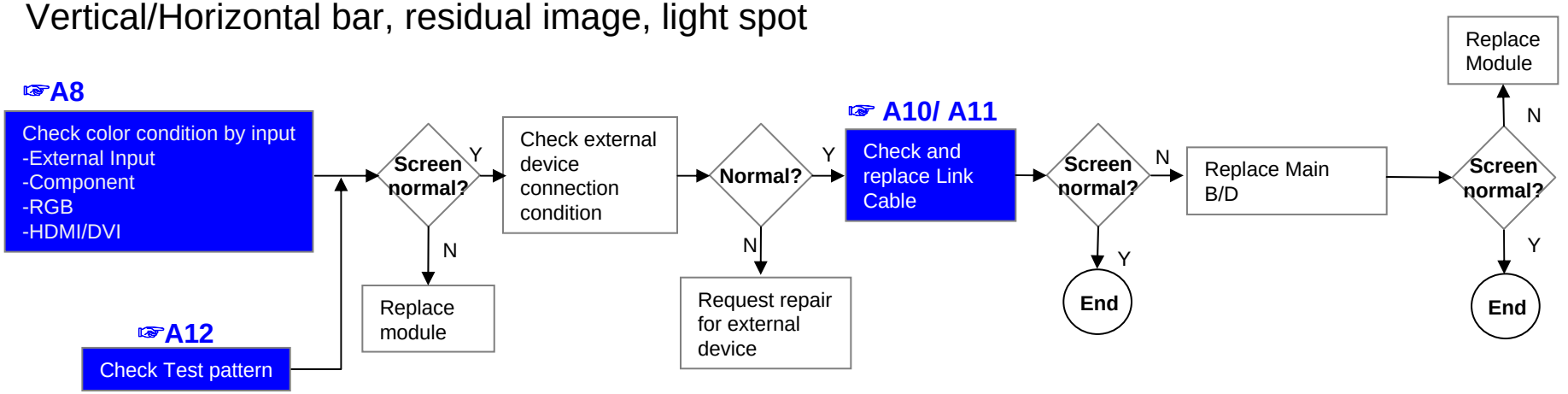
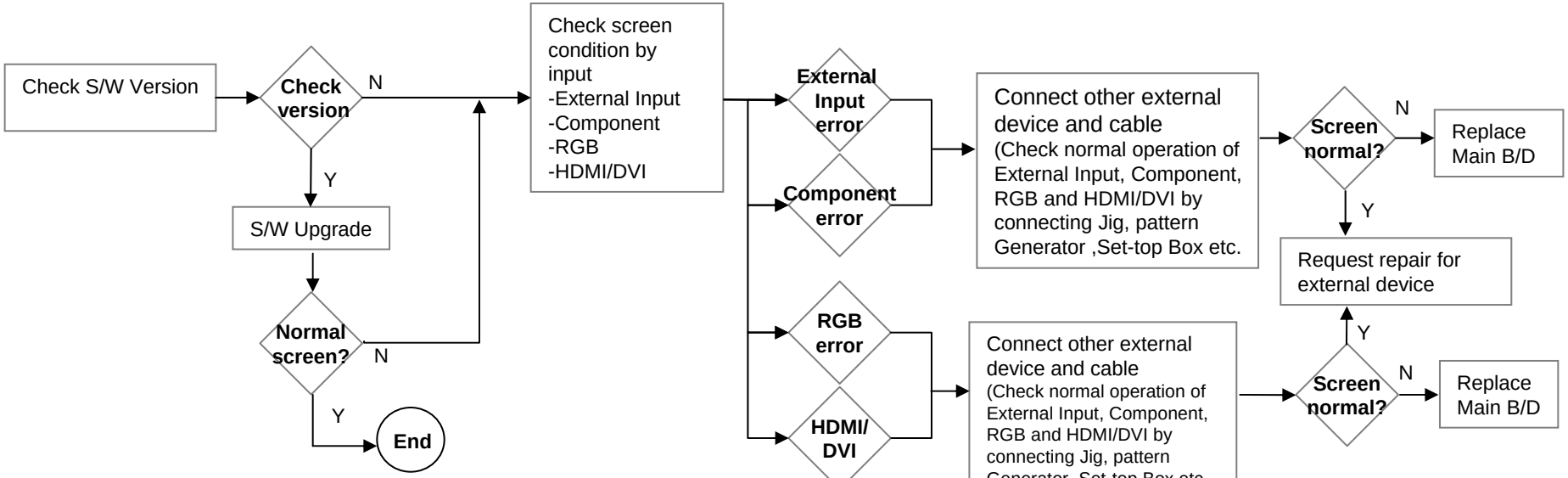
Vertical/Horizontal bar, residual image, light spot



External device screen error-Color error



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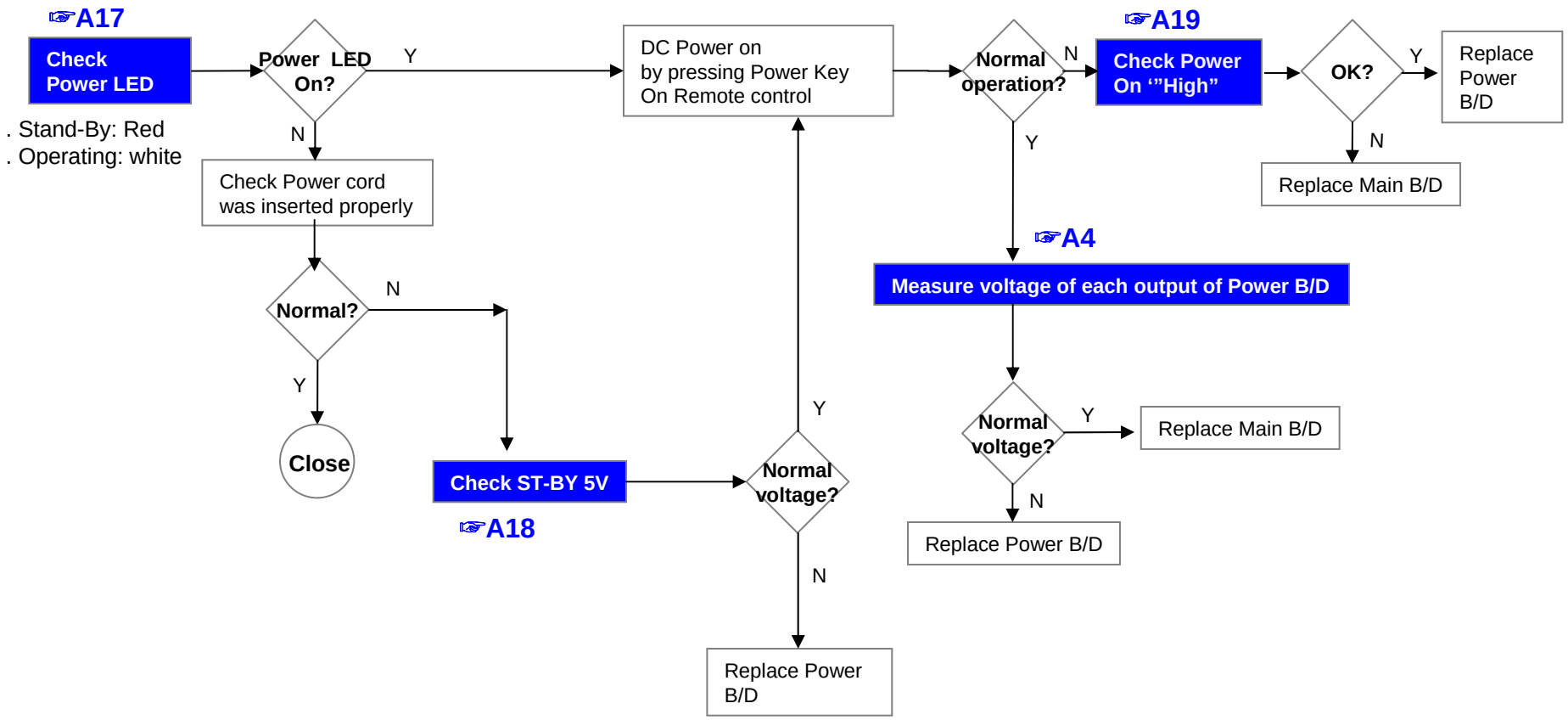
LCD TV	Error symptom	B. Power error	Established date	2010. 2 .19	
		No power	Revised date		6/13



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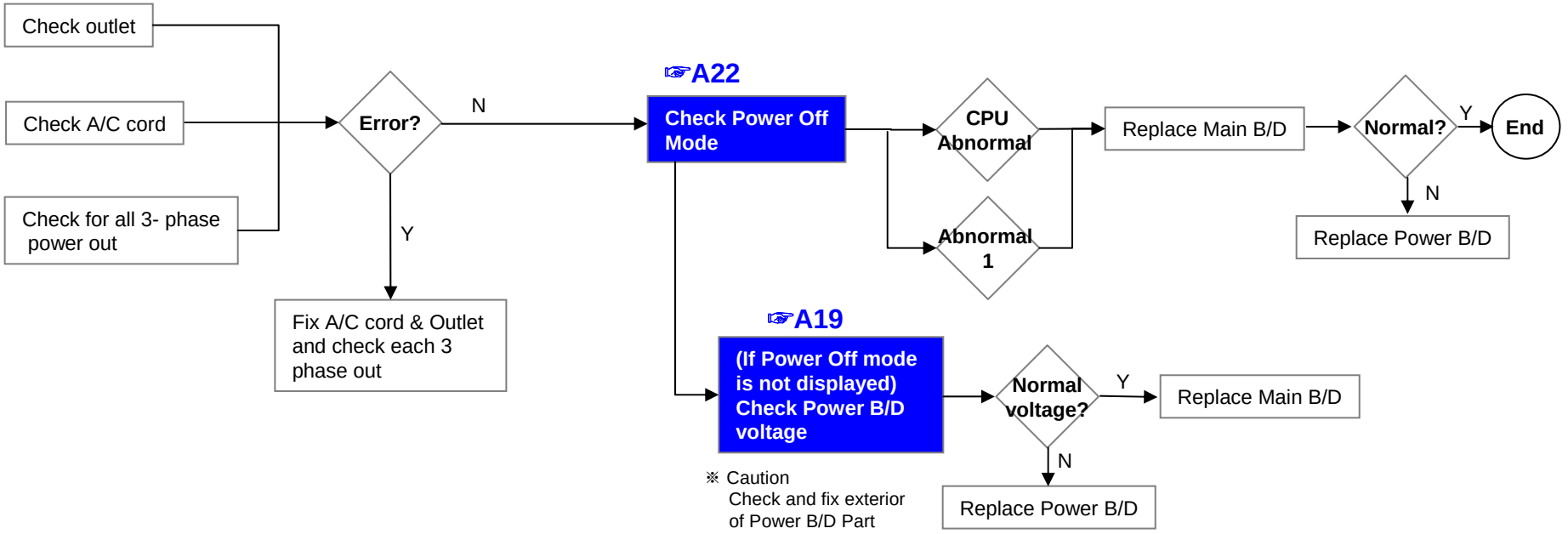
LCD TV	Error symptom	B. Power error	Established date	2010. 2 .19	
		Off when on, off while viewing, power auto on/off	Revised date		7/13



*** Please refer to the all cases which can be displayed on power off mode.**

Status	Power off List	Explanation
Normal	"POWEROFF_REMOTEKEY"	Power off by REMOTE CONTROL
	"POWEROFF_OFFTIMER"	Power off by OFF TIMER
	"POWEROFF_SLEEPTIMER"	Power off by SLEEP TIMER
	"POWEROFF_INSTOP"	Power off by INSTOP KEY
	"POWEROFF_AUTOOFF"	Power off by AUTO OFF
	"POWEROFF_ONTIMER"	Power off by ON TIMER
	"POWEROFF_RS232C"	Power off by RS232C
	"POWEROFF_RESREC"	Power off by Reservated Record
	"POWEROFF_RECEND"	Power off by End of Recording
	"POWEROFF_SWDOWN"	Power off by S/W Download
	"POWEROFF_UNKNOWN"	Power off by unknown status except listed case
Abnormal	"POWEROFF_ABNORMAL1"	Power off by abnormal status except CPU trouble
	"POWEROFF_CPUABNORMAL"	Power off by CPU Abnormal

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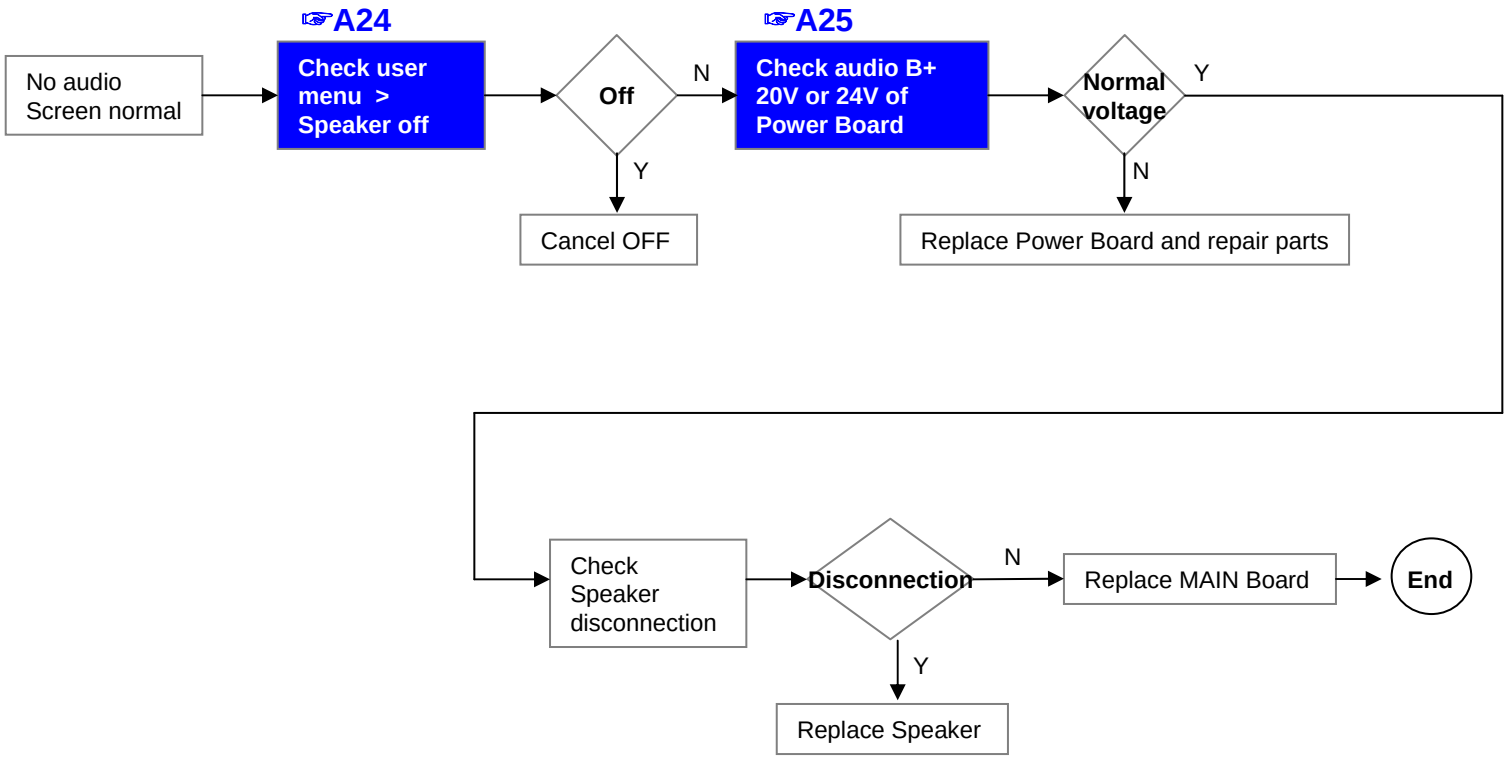
LCD TV	Error symptom	C. Audio error	Established date	2010. 2 .19	
		No audio/ Normal video	Revised date		8/13



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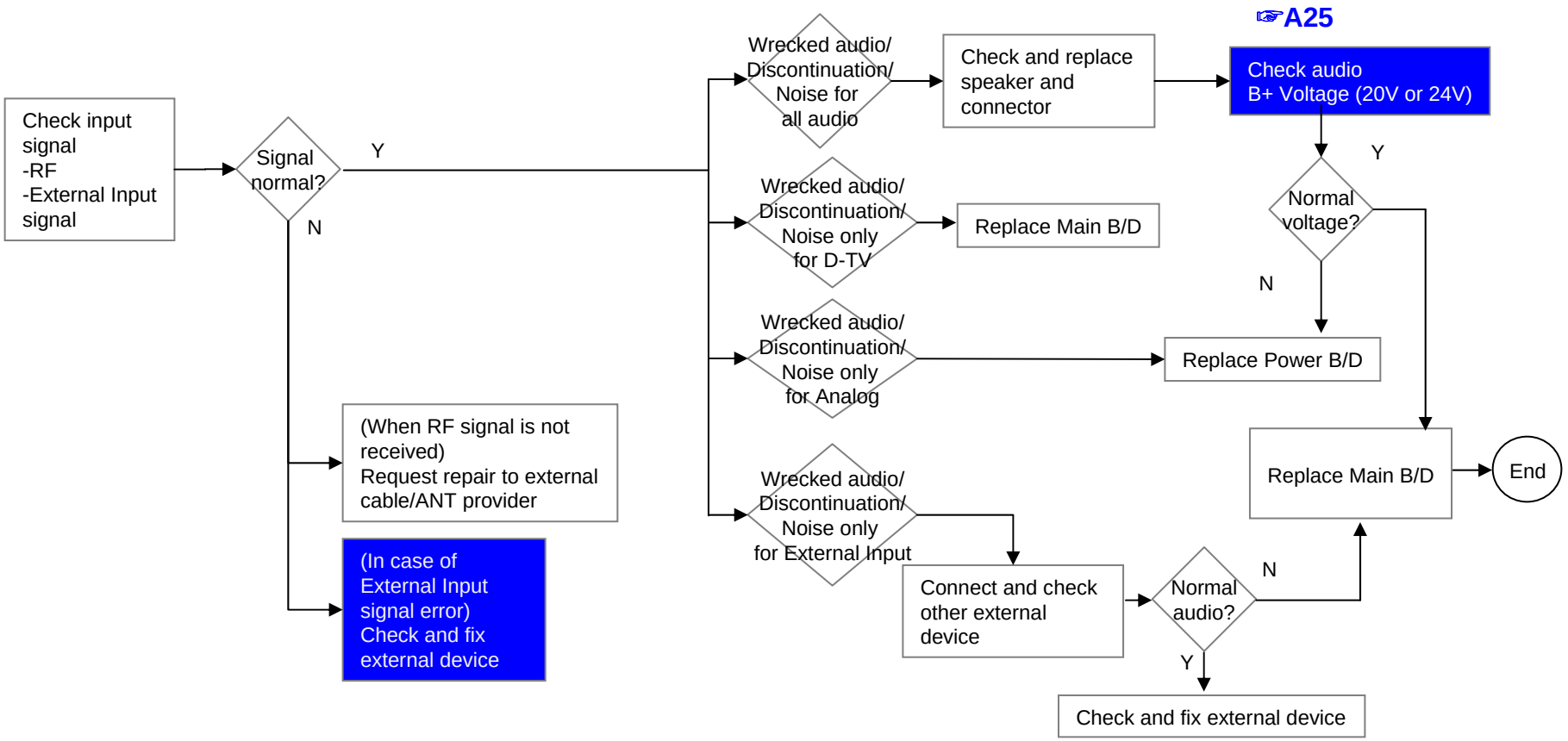
LCD TV	Error symptom	C. Audio error	Established date	2010. 2 .19	
		Wrecked audio/ discontinuation/noise	Revised date		9/13

→ abnormal audio/discontinuation/noise is same after "Check input signal" compared to No audio



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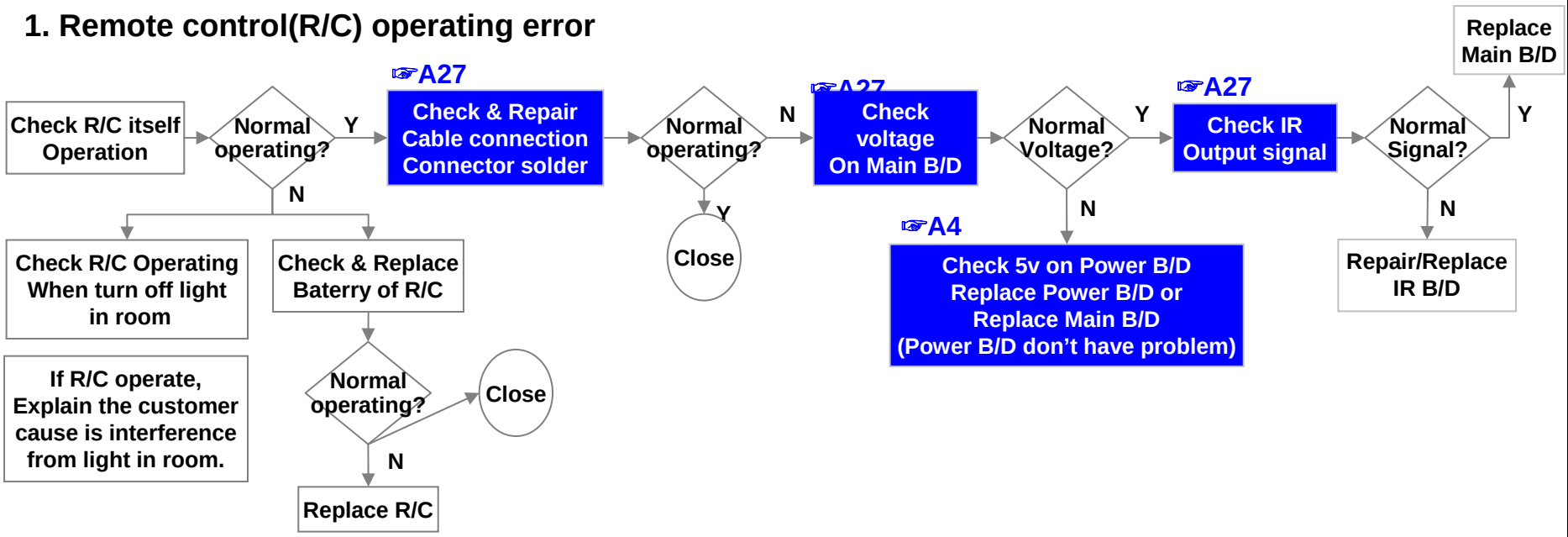
LCD TV	Error symptom	D. General Function Problem	Established date	2010. 2 .19	
		Remote control & Local switch checking	Revised date		10/13

1. Remote control(R/C) operating error



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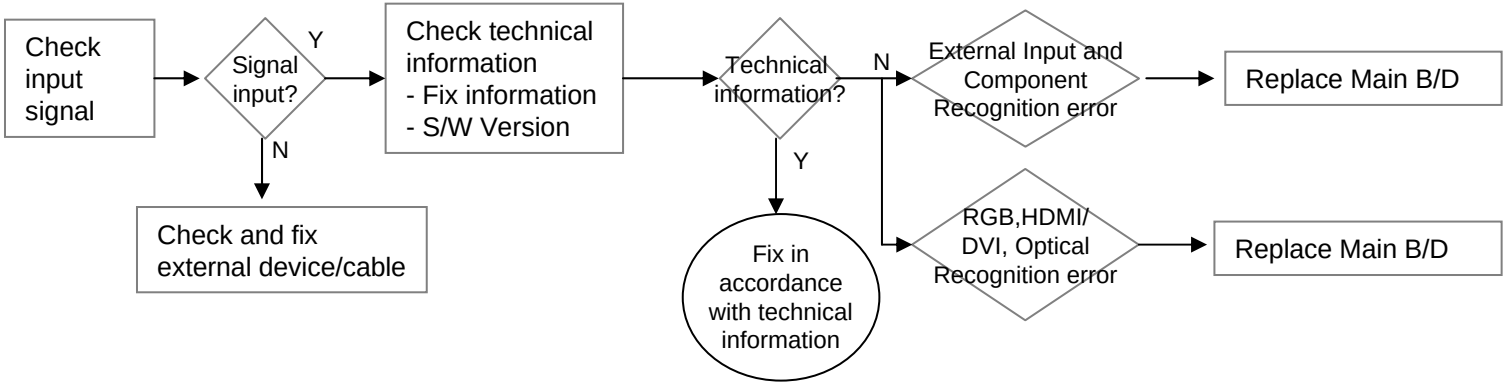
LCD TV	Error symptom	D. Function error	Established date	2010. 2 .19	
		External device recognition error	Revised date		11/13



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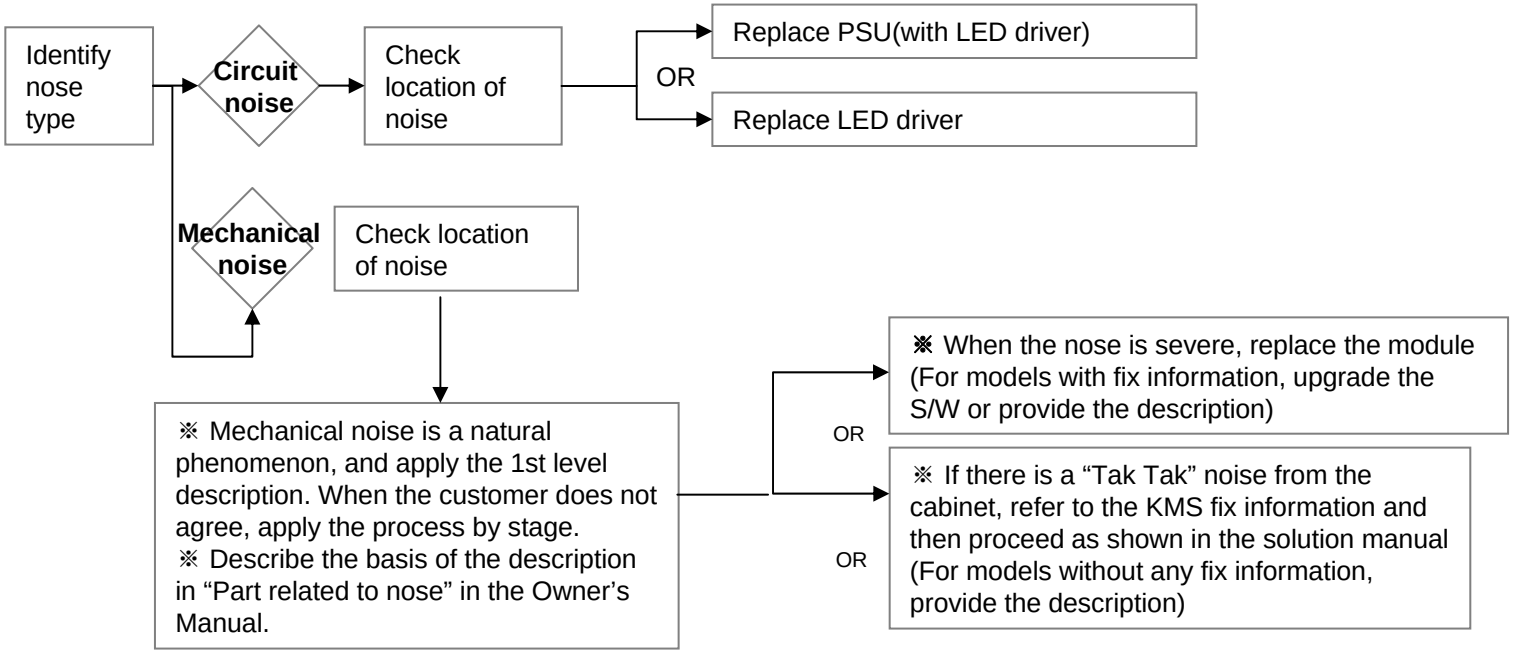
LCD TV	Error symptom	E. Noise	Established date	2010. 2 .19	
		Circuit noise, mechanical noise	Revised date		12/13


Identify nose type
Circuit noise
Check location of noise
OR
Replace PSU(with LED driver)
Replace LED driver
Mechanical noise
Check location of noise
※ Mechanical noise is a natural phenomenon, and apply the 1st level description. When the customer does not agree, apply the process by stage.
※ Describe the basis of the description in “Part related to nose” in the Owner’s Manual.
OR
※ When the nose is severe, replace the module (For models with fix information, upgrade the S/W or provide the description)
OR
※ If there is a “Tak Tak” noise from the cabinet, refer to the KMS fix information and then proceed as shown in the solution manual (For models without any fix information, provide the description)

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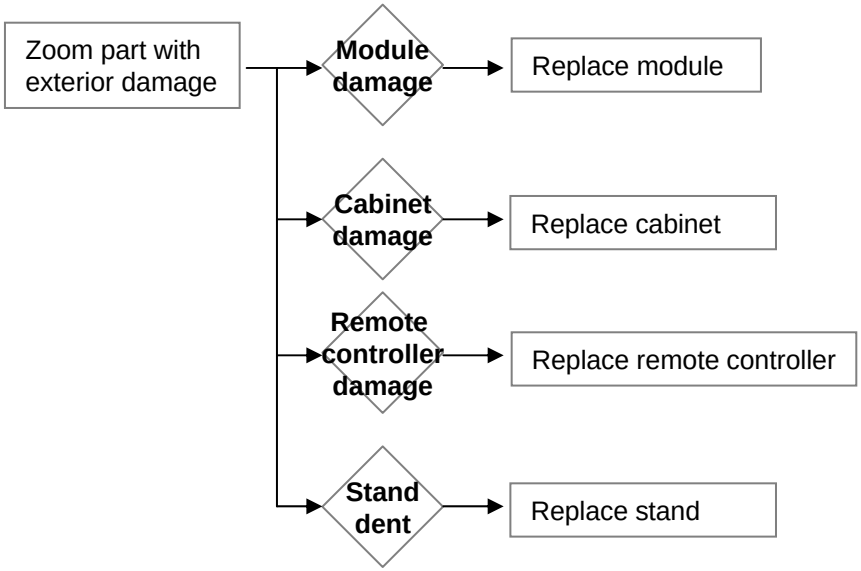
LCD TV	Error symptom	F. Exterior defect	Established date	2010. 2 .19	
		Exterior defect	Revised date		13/13



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Contents of LCD TV Standard Repair Process Detail Technical Manual

No.	Error symptom	Content	Page	Remarks
1	A. Video error_ No video/Normal audio	Check LCD back light with naked eye	A1	
2		LED driver B+ 24V measuring method	A2	
3		Check White Balance value	A3	
4		Power Board voltage measuring method	A4	
6	A. Video error_ No video/Video lag/stop	TUNER input signal strength checking method	A6	
7		LCD-TV Version checking method	A7	
9	A. Video error_Color error	LCD TV connection diagram	A8	
10		Tuner Checking Part	A9	
11		Check Link Cable (LVDS) reconnection condition	A10 A11	A10 : Edge LED A11 : Lamp
12		Adjustment Test pattern - ADJ Key	A12	
13	A. Video error_Vertical/Horizontal bar, residual image, light spot	LCD TV connection diagram	A8	
14		Check Link Cable (LVDS) reconnection condition	A10 A11	A10 : Edge LED A11 : Lamp
15		Adjustment Test pattern - ADJ Key	A12	
16	**<Appendix>** Defected Type caused by T-Con/ Inverter/ Module	Exchange T-Con Board (1)	A-1/5	
17		Exchange T-Con Board (2)	A-2/5	
18		Exchange LED driver Board (PSU)	A-3/5	
19		Exchange Module itself (1)	A-4/5	
20		Exchange Module itself (2)	A-5/5	

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Contents of LCD TV Standard Repair Process Detail Technical Manual

Continued from previous page

No.	Error symptom	Content	Page	Remarks
21	B. Power error_No power	Check front display LED	A17	
22		Check power input Voltage & ST-BY 5V	A18	
23		Checking method when power is ON	A19	
24		POWER BOARD voltage measuring method	A4	
25				
26	B. Power error_Off when on, off while viewing	POWER OFF MODE checking method	A22	
27	B. Power error_Off when on, off while viewing	POWER BOARD PIN voltage checking method	A19	
28	C. Audio error_No audio/Normal video	Checking method in menu when there is no audio	A24	
29		Voltage and speaker checking method when there is no audio	A25	
30	C. Audio error_Wrecked audio/discontinuation	Voltage and speaker checking method in case of audio error	A25	
31	D. Function error_ No response in remote controller, key error	Remote controller operation checking method	A27	

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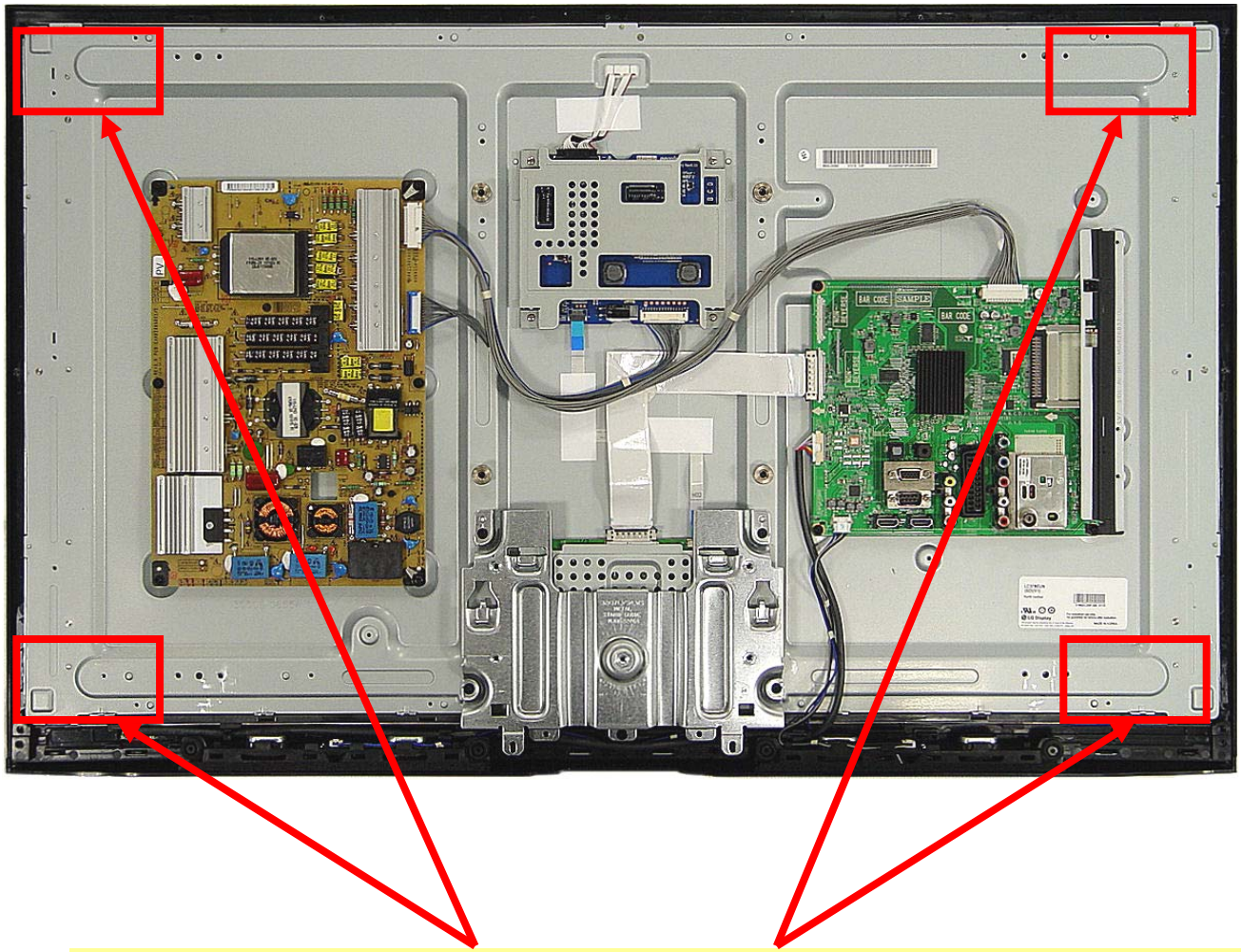
LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2011. 2 .07	
	Content	Check LCD back light with naked eye	Revised date		A1

<ALL MODELS>



After turning on the power and disassembling the case, check with the naked eye, whether you can see light from 4 locations.

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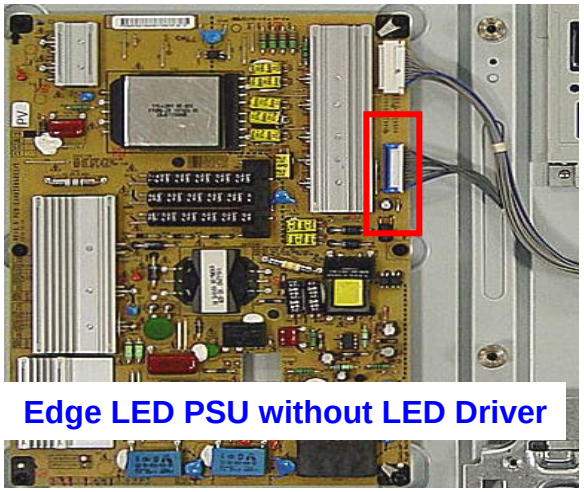
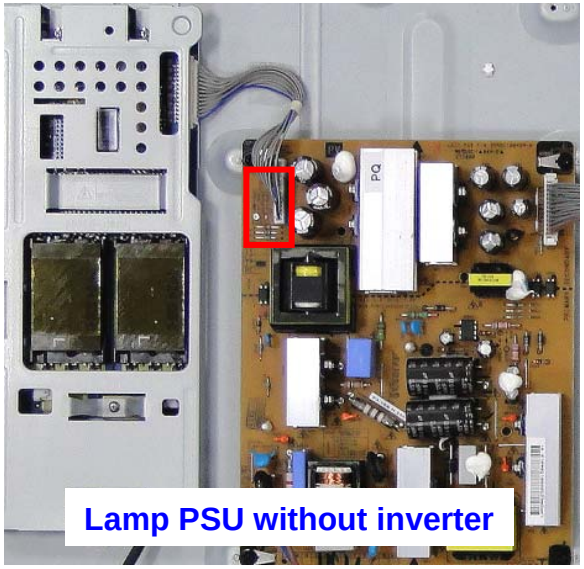


Edge LED PSU without LED Driver



Lamp PSU without inverter

Check the DC 24V, 12V, 3.5V and Inverter on

* ALEF/OS 42/47/55”/60”

Power Board ↔ Drive Board – PSU		
	14 pin	14 pin
1 ~ 5	24V	24V
6 ~ 10	GND	GND
11	Detect	Detect
12	Inverter On/Off	Inverter On/Off
13	Int. PWM	Int. PWM
14	Ext. PWM (PDIM)	Ext. PWM (PDIM)

* ALL 32”/37”

14 Pin (Power Board ↔ Driver) PSU	
1 ~ 5	24V
6 ~ 10	GND
11	Detect
12	Inverter On/Off
13	Int. PWM
14	Ext. PWM (PDIM)

*** 26” ~ 47” : `11 Pin map**

Lamp (Power Board ↔ Inverter) - PSU	
	14 Pin
1 ~ 5	24V
6 ~ 10	GND
11	Detect
12	Inverter On/Off
13	Int. PWM
14	Ext. PWM (PDIM)

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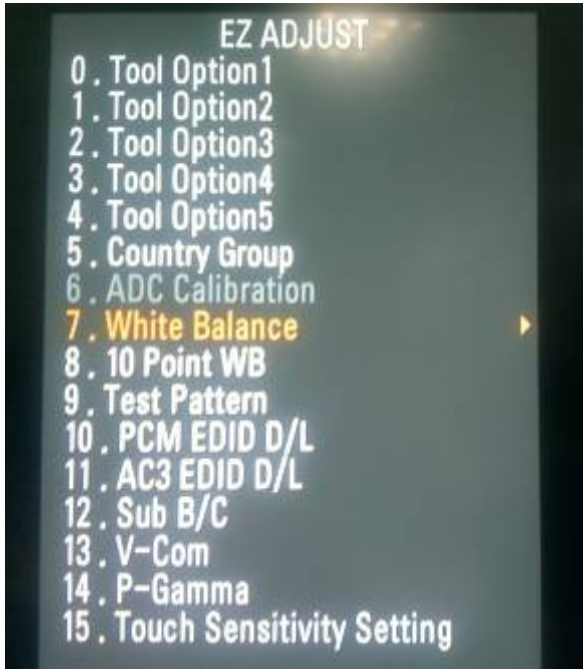
LCD TV	Error symptom	A. Video error_No video/Normal audio	Established date	2011. 2 .07	
	Content	Check White Balance value	Revised date		A3

<ALL MODELS>


EZ ADJUST
0 . Tool Option1
1 . Tool Option2
2 . Tool Option3
3 . Tool Option4
4 . Tool Option5
5 . Country Group
6 . ADC Calibration
7 . White Balance
8 . 10 Point WB
9 . Test Pattern
10 . PCM EDID D/L
11 . AC3 EDID D/L
12 . Sub B/C
13 . V-Com
14 . P-Gamma
15 . Touch Sensitivity Setting

Entry method

1. Press the ADJ button on the remote controller for adjustment.

2. Enter into White Balance of item 7.

3. After recording the R, G, B (GAIN, Cut) value of Color Temp (Cool/Medium/Warm), re-enter the value after replacing the MAIN BOARD.

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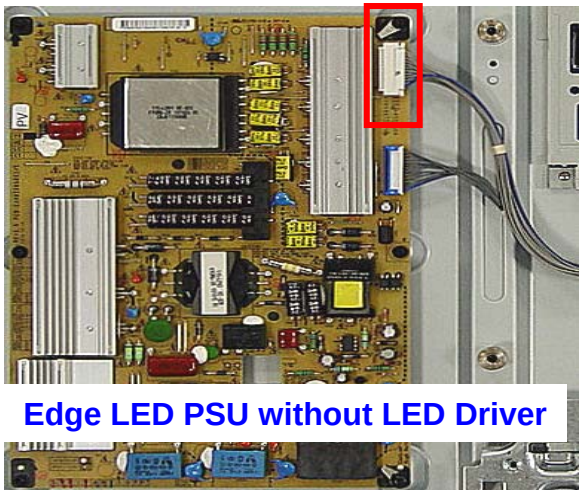
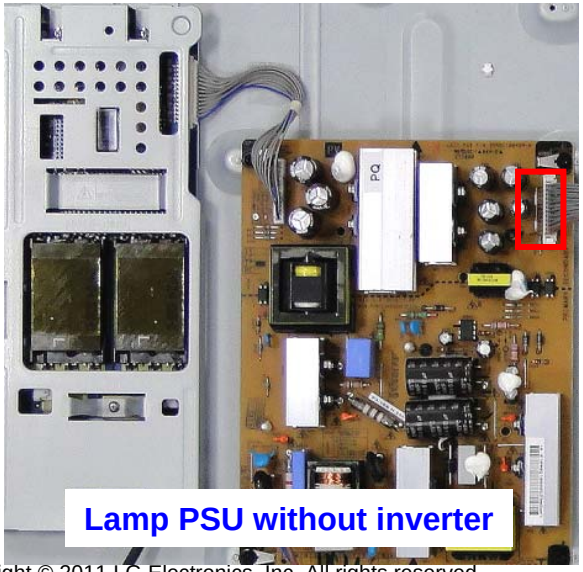
LCD TV	Error symptom	A. Video error_No video/ Audio	Established date	2011. 2 .07	
	Content	Power Board voltage measuring method	Revised date		A4



Edge LED PSU without LED Driver



Lamp PSU without inverter

Check the DC 20Vor24V, 12V, 3.5V.

24 Pin (Power Board ↔ Main Board) - 공통			
SMAW200-H24S (YEONHO)			
1	Power on	2	20V (24V)
3	20V (24V)	4	20V (24V)
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	N.C
17	12V	18	Inverter On/off
19	12V	20	Lamp : A-Dim LED : N.C
21	12V	22	PWM Dim #1
23	N.C • Lamp SCANNING Model : PWM Dim #2	24	Error-out

24 Pin (Power Board ↔ Main Board)			
FW20020-24SB (FOOSUNG)			
1	Power on	2	20V (24V)
3	20V (24V)	4	20V (24V)
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	GND
17	12V	18	Inverter On/off
19	12V	20	Lamp : A-Dim
21	12V	22	PWM Dim #1
23	N.C	24	Error-out

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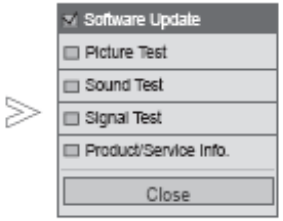
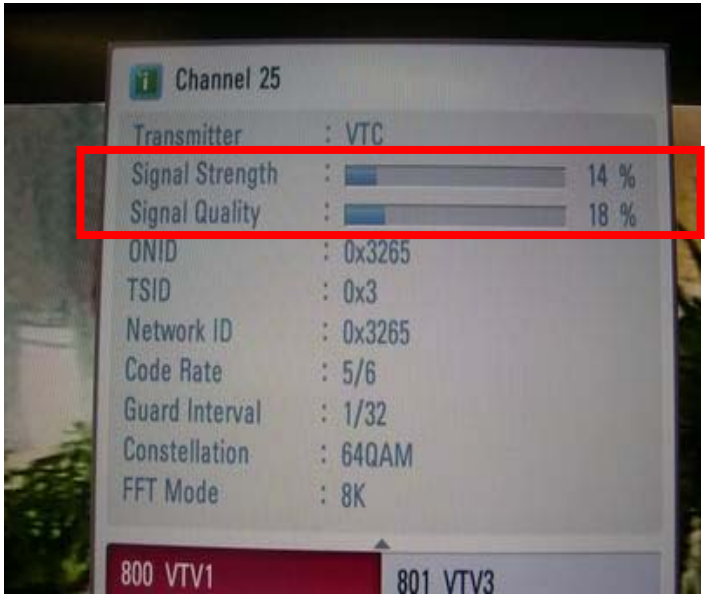
<ALL MODELS>



MENU -→ red key(customer support -→ signal test -→ select channel



When the signal is strong, use the attenuator (-10dB, -15dB, -20dB etc.)

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<ALL MODELS>

1. Checking method for remote controller for adjustment

Version

Press the IN-START with the remote controller for adjustment

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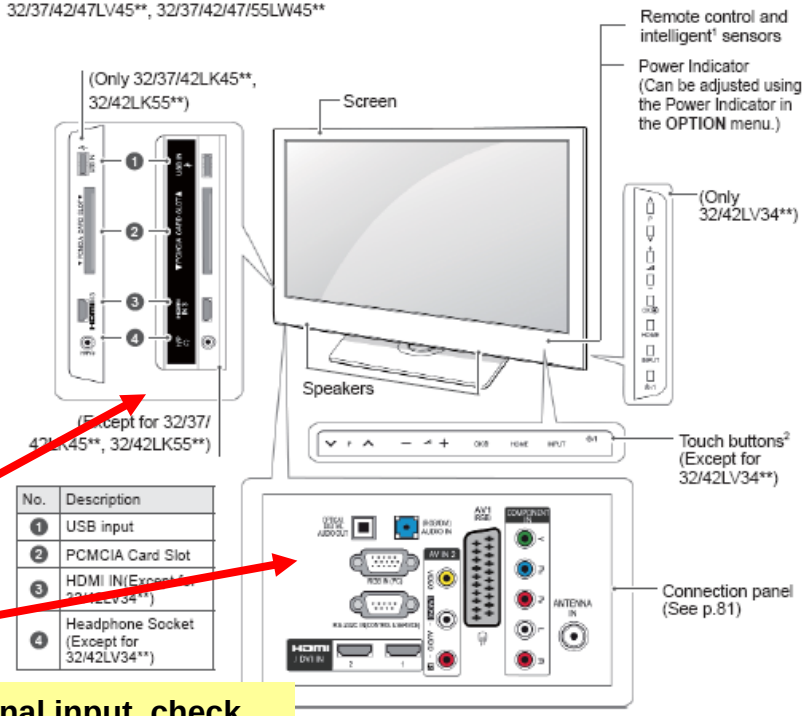
• Image shown may differ from your TV.

Only 32/37/42LK45**, 32/42LK55**, 32LV25**, 32/42LV34**, 32/37/40/42/47LV35**, 32/37/42/47LV45**, 32/37/42/47/55LW45**


Remote control and intelligent[1] sensors
Power Indicator (Can be adjusted using the Power Indicator in the OPTION menu.)
(Only 32/42LV34**)
(Only 32/37/42LK45**, 32/42LK55**)
Screen
Speakers
(Except for 32/37/42LK45**, 32/42LK55**)
Touch buttons[2] (Except for 32/42LV34**)
Connection panel (See p.81)

No.	Description
1	USB input
2	PCMCIA Card Slot
3	HDMI IN(Except for 32/42LV34**)
4	Headphone Socket (Except for 32/42LV34**)

As the part connecting to the external input, check the screen condition by signal

Button	Description
∨ P ∧	Scrolls through the saved programmes
− ◁ +	Adjusts the volume level
OK	Selects the highlighted menu option or confirms an input
HOME	Accesses the main menus, or saves your input and exits the menus
INPUT	Changes the input source
⏻/I	Turns the power on or off

1 Intelligent sensor - Adjusts the image quality corresponding to the surrounding environment.
2. Touch Button - You can use the desired button function by touching.

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LCD TV	Error symptom	A. Video error_Video error, video lag/stop	Established date	2011. 2 .07	
	Content	TUNER checking part	Revised date		A9

<ALL MODELS>

Checking method:
1. Check the signal strength or check whether the screen is normal when the external device is connected.
2. After measuring each voltage from power supply, finally replace the MAIN BOARD.

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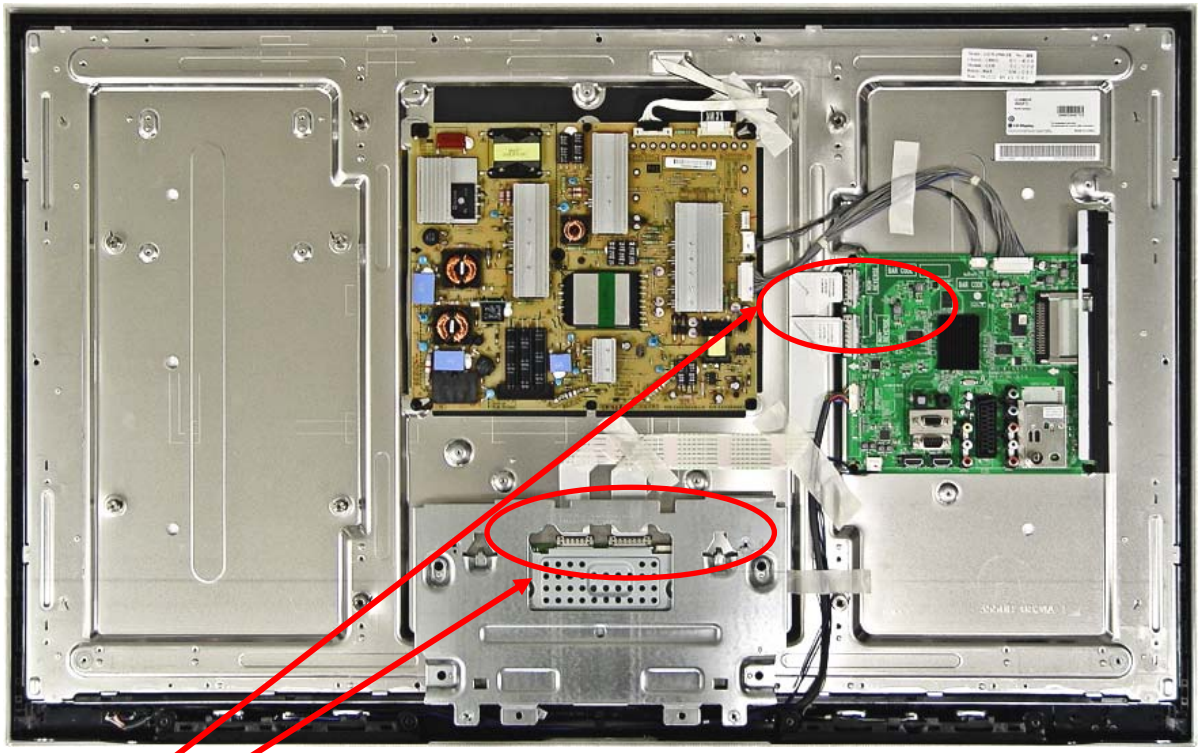
LCD TV	Error symptom	A. Video error_Color error	Established date	2011. 2 .07	
	Content	Check Link Cable (LVDS) reconnection condition	Revised date		A10

<LV** : Edge LED Series Models>



Check the contact condition of the Link Cable, especially dust or mis insertion.

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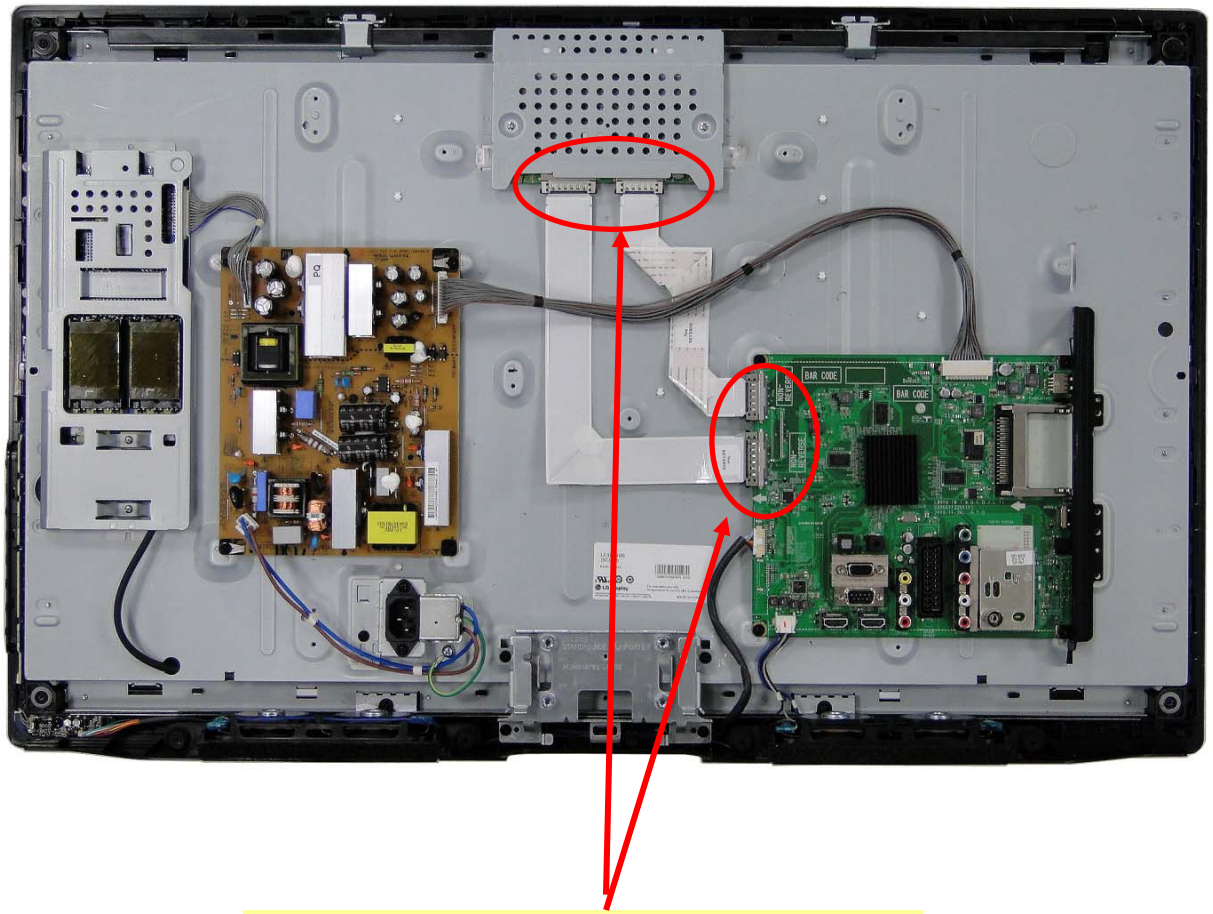
LCD TV	Error symptom	A. Video error_Color error	Established date	2011. 2 .07	
	Content	Check Link Cable (LVDS) reconnection condition	Revised date		A11

<LK** : Lamp series Models>



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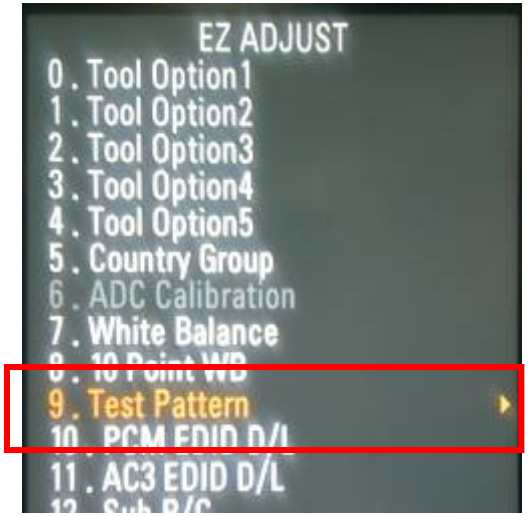
Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	A. Video error_Color error	Established date	2011. 2 .07	
	Content	Adjustment Test pattern - ADJ Key	Revised date		A12



You can view 6 types of patterns using the ADJ Key

Checking item : 1. Defective pixel 2. Residual image 3. MODULE error (ADD-BAR,SCAN BAR..)
4.Video error (Classification of MODULE or Main-B/D!)

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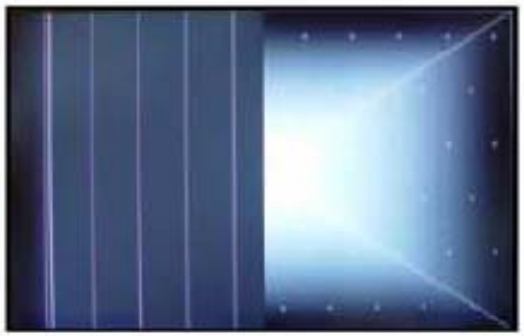
Appendix : Exchange T-Con Board (1)

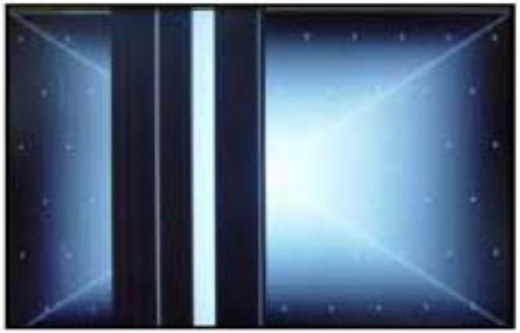
Solder defect, CNT Broken

Solder defect, CNT Broken

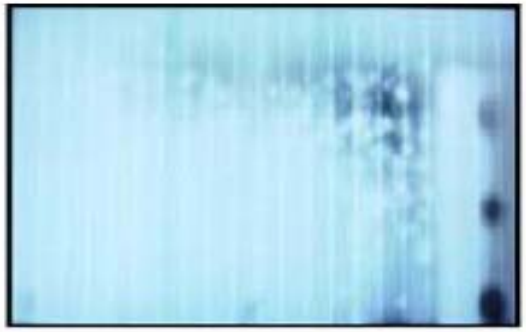


Solder defect, CNT Broken

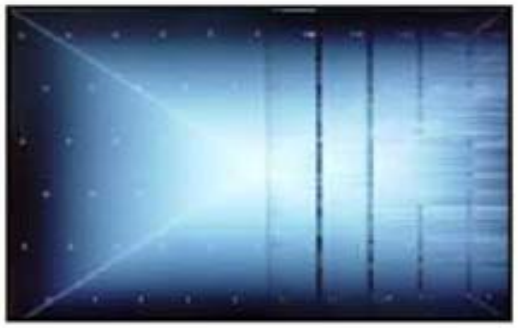
Solder defect, CNT Broken



Solder defect, CNT Broken



Abnormal Power Section



Solder defect, Short/Crack

Abnormal Power Section

Solder defect, Short/Crack

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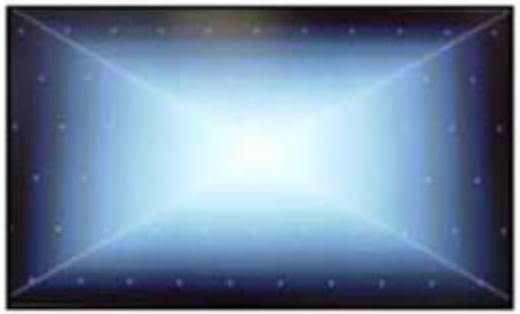
Appendix : Exchange T-Con Board (2)



Abnormal Power Section

Abnormal Power Section

Solder defect, Short/Crack

Solder defect, Short/Crack

Fuse Open, Abnormal power section

Abnormal Display

GRADATION

Noise

GRADATION

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Appendix : Exchange PSU(LED driver)

No Light

Dim Light

Dim Light

Dim Light

No picture/Sound Ok

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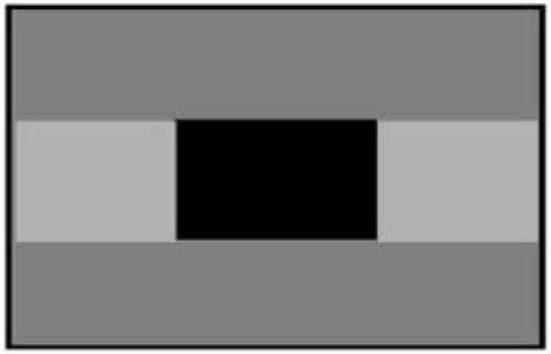
Appendix : Exchange the Module (1)

Panel Mura, Light leakage

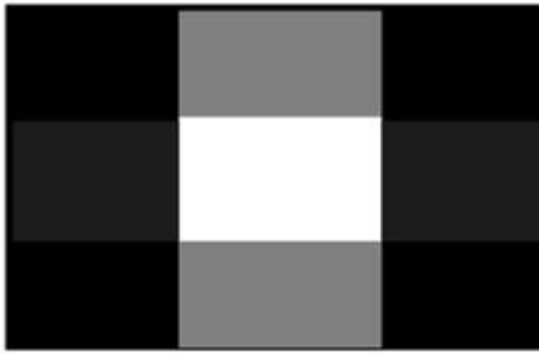
Panel Mura, Light leakage

Press damage



Crosstalk

Press damage



Crosstalk

Press damage

Un-repairable Cases

In this case please exchange the module.

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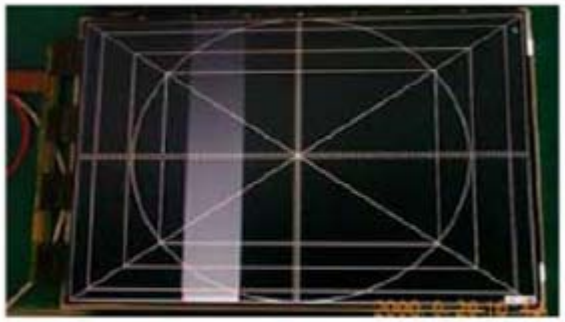
Appendix : Exchange the Module (2)



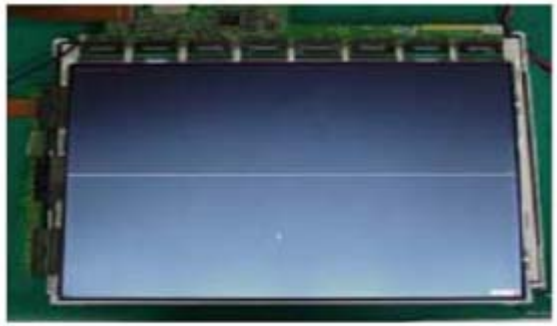
Vertical Block
Source TAB IC Defect

Vertical Line
Source TAB IC Defect

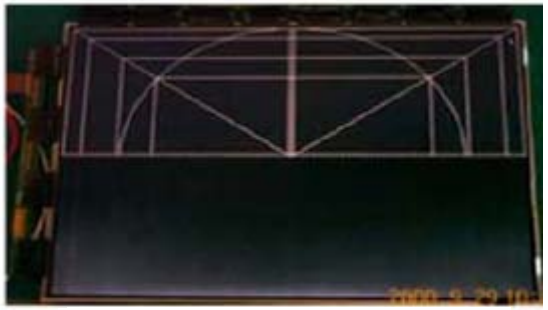
Vertical Block
Source TAB IC Defect

Horizontal Block
Gate TAB IC Defect

Horizontal Block
Gate TAB IC Defect



Horizontal line
Gate TAB IC Defect



Horizontal Block
Gate TAB IC Defect

Un-repairable Cases

In this case please exchange the module.

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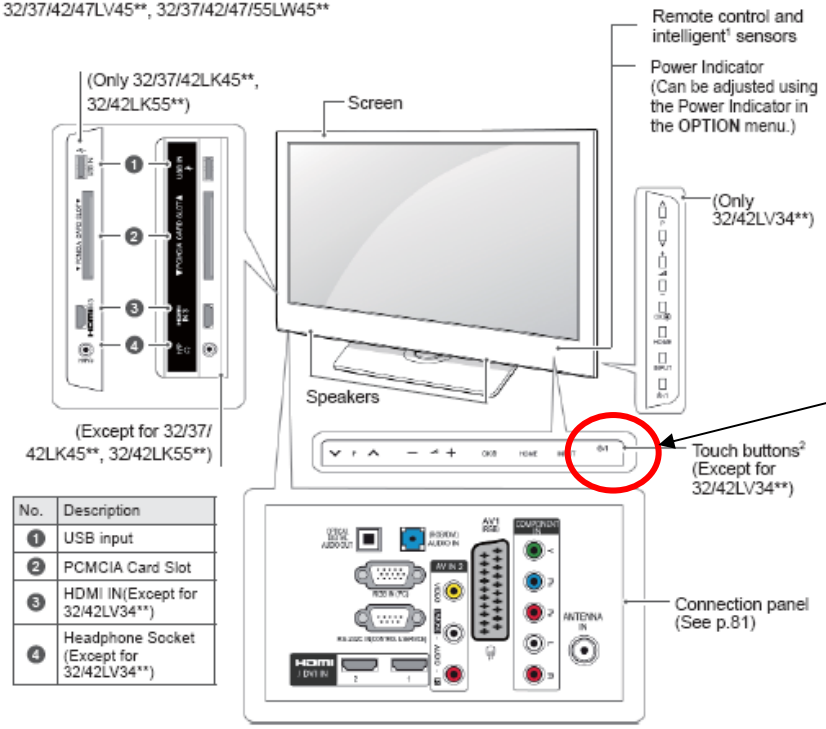
• Image shown may differ from your TV.

Only 32/37/42LK45**, 32/42LK55**, 32LV25**, 32/42LV34**, 32/37/40/42/47LV35**, 32/37/42/47LV45**, 32/37/42/47/55LW45**


Remote control and intelligent[1] sensors
Power Indicator (Can be adjusted using the Power Indicator in the OPTION menu.)
(Only 32/37/42LK45**, 32/42LK55**)
Screen
(Only 32/42LV34**)
Speakers
(Except for 32/37/42LK45**, 32/42LK55**)
Touch buttons[2] (Except for 32/42LV34**)
Connection panel (See p.81)

No.	Description
1	USB input
2	PCMCIA Card Slot
3	HDMI IN(Except for 32/42LV34**)
4	Headphone Socket (Except for 32/42LV34**)

Front LED control :
Menu → Option → Power Indicator → Standby light ON

ST-BY condition: Red
Power ON condition: white

Button	Description
∨ P ∧	Scrolls through the saved programmes
− ◁ +	Adjusts the volume level
OK⊙	Selects the highlighted menu option or confirms an input
HOME	Accesses the main menus, or saves your input and exits the menus
INPUT	Changes the input source
⏻/I	Turns the power on or off

1 Intelligent sensor - Adjusts the image quality corresponding to the surrounding environment.
2. Touch Button - You can use the desired button function by touching.

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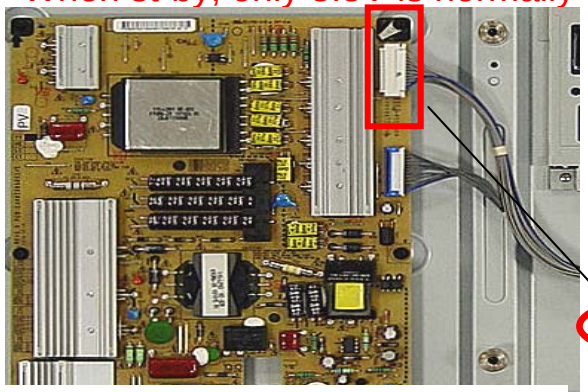
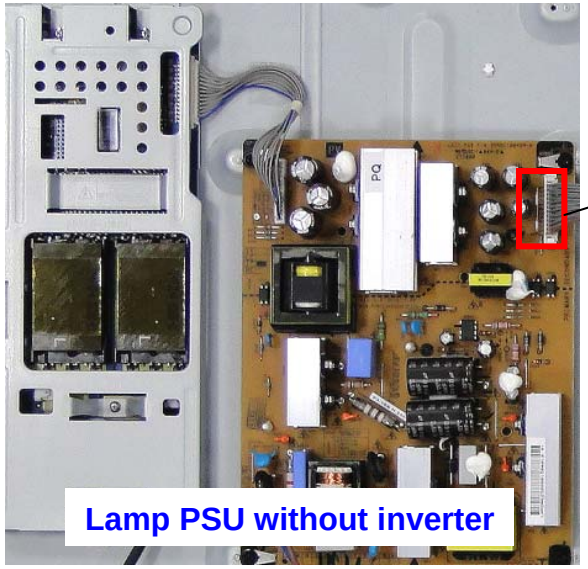
LCD TV	Error symptom	B. Power error _No power	Established date	2011. 2 .07	
	Content	Check power input voltage and ST-BY 3.5V	Revised date		A18

For ’11 models, there is no voltage out for st-by purpose.
When st-by, only 3.5V is normally on.



Edge LED PSU without LED Driver



Lamp PSU without inverter

Check the 3.5V when st-by

24 Pin (Power Board ↔ Main Board) - 공통 SMAW200-H24S (YEONHO)			
1	Power on	2	20V (24V)
3	20V (24V)	4	20V (24V)
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	N.C
17	12V	18	Inverter On/off
19	12V	20	Lamp : A-Dim LED : N.C
21	12V	22	PWM Dim #1
23	N.C • Lamp SCANNING Model : PWM Dim #2	24	Error-out

24 Pin (Power Board ↔ Main Board) FW20020-24SB (FOOSUNG)			
1	Power on	2	20V (24V)
3	20V (24V)	4	20V (24V)
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	GND
17	12V	18	Inverter On/off
19	12V	20	Lamp : A-Dim
21	12V	22	PWM Dim #1
23	N.C	24	Error-out

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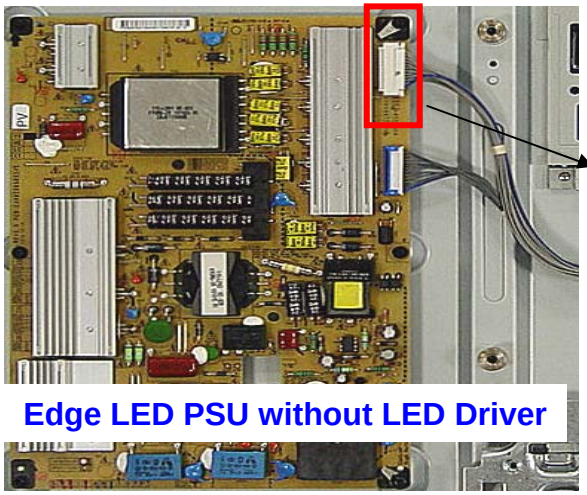
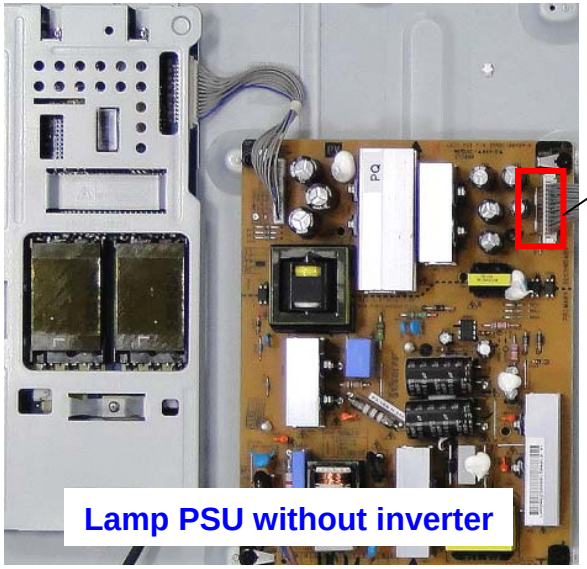


Edge LED PSU without LED Driver



Lamp PSU without inverter

Check “power on” pin is high

24 Pin (Power Board ↔ Main Board) - 공통 SMAW200-H24S (YEONHO)			
1	Power on	2	20V (24V)
3	20V (24V)	4	20V (24V)
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	N.C
17	12V	18	Inverter On/off
19	12V	20	Lamp : A-Dim LED : N.C
21	12V	22	PWM Dim #1
23	N.C • Lamp SCANNING Model : PWM Dim #2	24	Error-out

24 Pin (Power Board ↔ Main Board) FW20020-24SB (FOOSUNG)			
1	Power on	2	20V (24V)
3	20V (24V)	4	20V (24V)
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	GND
17	12V	18	Inverter On/off
19	12V	20	Lamp : A-Dim
21	12V	22	PWM Dim #1
23	N.C	24	Error-out

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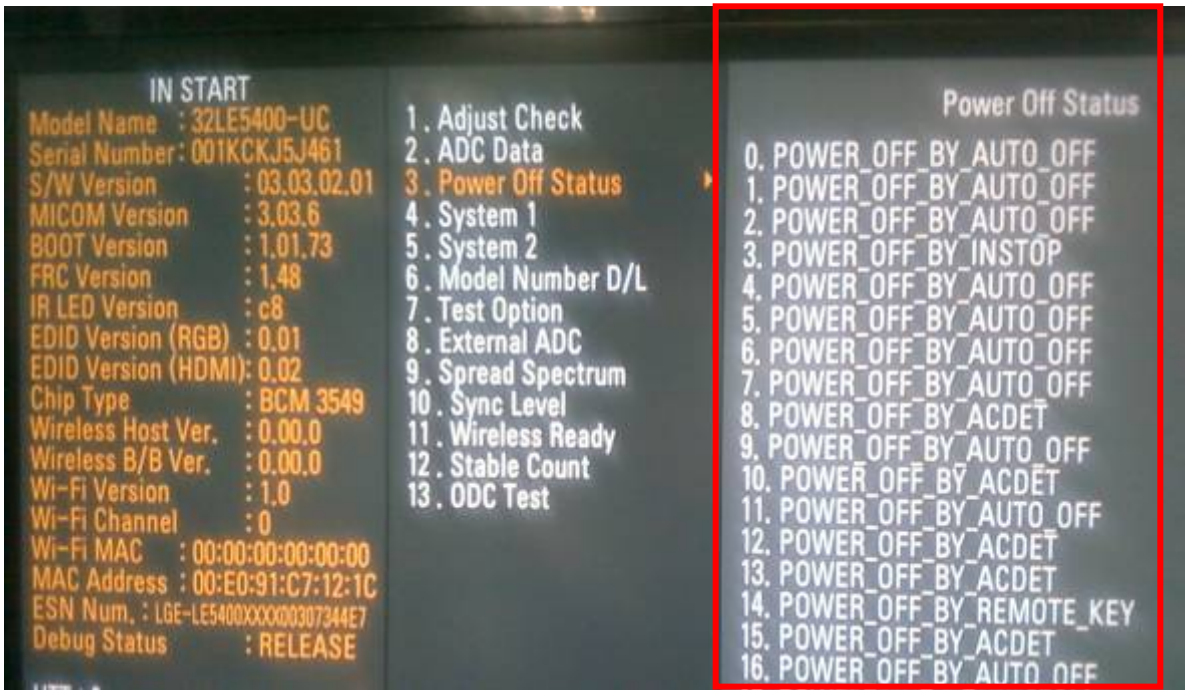
Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	B. Power error _Off when on, off whiling viewing	Established date	2011. 2 .07	
	Content	POWER OFF MODE checking method	Revised date		A22

<ALL MODELS>



Entry method

1. Press the IN-START button of the remote controller for adjustment

2. Check the entry into adjustment item 3

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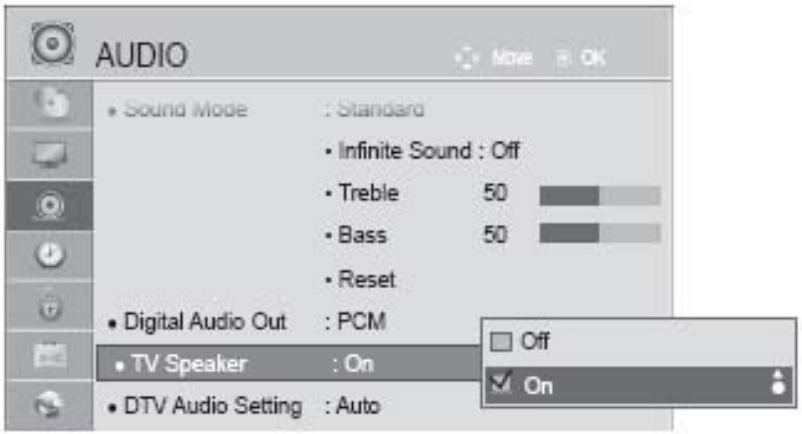
LCD TV	Error symptom	C. Audio error_No audio/Normal video	Established date	2011. 2 .07	
	Content	Checking method in menu when there is no audio	Revised date		A24

<ALL MODELS>



Checking method

1. Press the MENU button on the remote controller
2. Select the AUDIO function of the Menu
3. Select TV Speaker from Off to On

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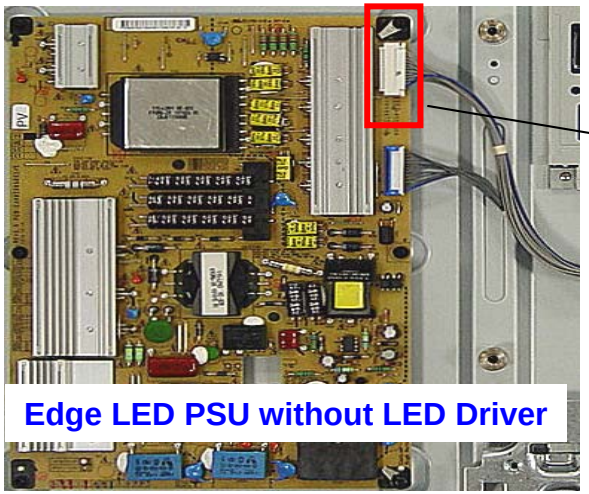
Standard Repair Process Detail Technical Manual

LCD TV	Error symptom	C. Audio error_No audio/Normal video	Established date	2011. 2 .07	
	Content	Voltage and speaker checking method when there is no audio	Revised date		A25

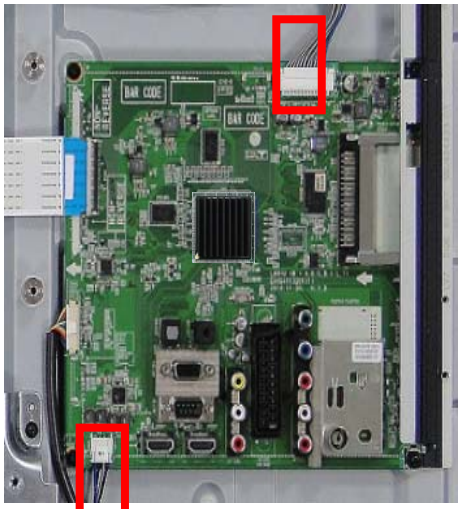
<ALL MODELS>



②

24 Pin (Power Board ↔ Main Board) - 공통			
SMAW200-H24S (YEONHO)			
1	Power on	2	20V (24V)
3	20V (24V)	4	20V (24V)
5	GND	6	GND
7	GND	8	GND
9	3.5V	10	3.5V
11	3.5V	12	3.5V
13	GND	14	GND
15	GND	16	N.C
17	12V	18	Inverter On/off
19	12V	20	Lamp : A-Dim LED : N.C
21	12V	22	PWM Dim #1
23	N.C • Lamp SCANNING Model : PWM Dim #2	24	Error-out

①



③

Checking order when there is no audio

① Check the contact condition of 20V or 24V connector of Main Board

② Measure the 24V input voltage supplied from Power Board
(If there is no input voltage, remove and check the connector)

③ Connect the tester RX1 to the speaker terminal and if you hear the Chik Chik sound when you touch the GND and output terminal, the speaker is normal.

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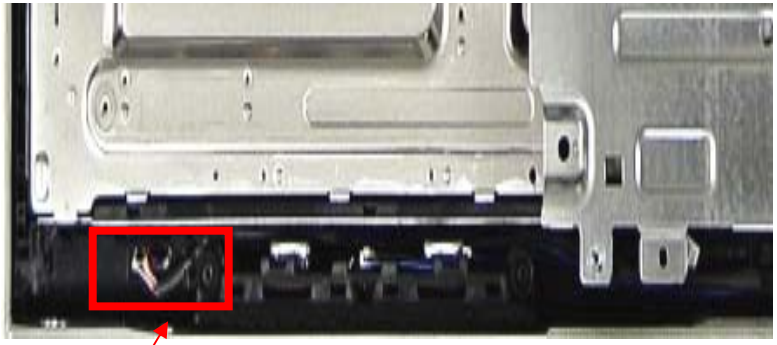
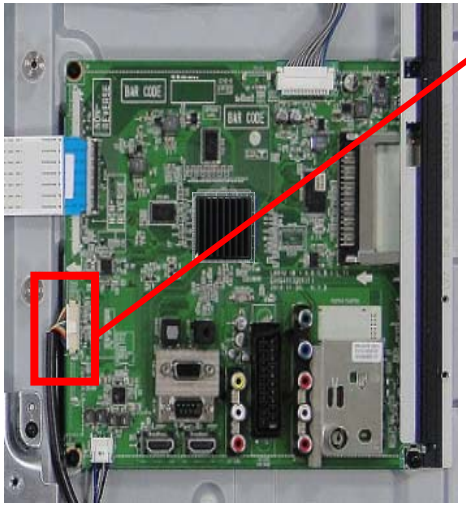
LCD TV	Error symptom	D. Function error_ No response in remote controller, key error	Established date	2011. 2 .07	
	Content	Remote controller operation checking method	Revised date		A27

<ALL MODELS>



1



2

3

4

P2401, P2402	
1	EYEQ_SCL
2	EYEQ_SDA
3	GND
4	KEY1
5	KEY2
6	St 3.3V
7	GND
8	LED_B
9	IR
10	GND
11	Normal 3.3V
12	LED_R
13	GND
14	Soft Touch_SCL
15	Soft Touch_SDA

Checking order

1, 2. Check IR cable condition between IR & Main board.
3. Check the st-by 3.3V on the terminal 6.
4. When checking the Pre-Amp when the power is in ON condition, it is normal when the Analog Tester needle moves slowly, and defective when it does not move at all.

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